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FEATURE SECTION

Editor's Note. The following three articles were written at the invitation of the Editor to illustrate the advances in physical facilities for pharmaceutical education.

THE SCHOOL OF PHARMACY, MEDICAL CENTER, WEST VIRGINIA UNIVERSITY

J. LESTER HAYMAN

The Medical Center Campus of West Virginia University, located two miles from the main University Campus, comprises an area of approximately 145 acres. Situated on a knoll almost in the center of the plot there is a single building which will house the Schools of Dentistry, Medicine, Nursing, Pharmacy, and the Teaching Hospital. The exterior of the building is of brick and stone enhanced by large aluminum frames against a warm gray background with glass facing in a variety of tones of gray and blue into which are floated the window patterns. Glazed tile has been used on the interior, and the walls on each floor of the Basic Sciences section are in a different color. The entire building is air conditioned, utilizing thirty air-conditioning units together with the various necessary exhaust systems. Two interesting facts in this regard are worthy of mention. First, the animal quarters are provided with a separate air-conditioning facility, and the quarters are air locked from the other sections of the building, thus preventing odors from escaping into the Basic Sciences section of the building. Second, the virus hood exhaust in the microbiology quarters sterilizes the air by the use of heat to about 700° F. before ejection from the building. The building is 950 feet long, 545 feet wide and is from five to fourteen stories high.

The section of the Basic Sciences Building housing the School of Pharmacy has 1,256 rooms providing 483,000 square feet of floor space. The Teaching Hospital section has 2,156 rooms providing 564,000 square feet of floor space and is built to provide 522 beds of which 250 will be equipped for immediate use.

The Medical Center Building has been completed at a cost of approximately thirty million dollars. The construction and the operation of the Medical Center have been financed by a special state tax on soft drinks yielding over three million dollars per year which is earmarked for this particular purpose. Ground was broken for construction on October 7, 1954. The Basic Sciences Building was completed so that the Schools of Dentistry and Medicine could begin instruction in the new Center in September, 1957. The School of Pharmacy occupied its quarters in July, 1958. The School of Nursing and the Teaching Hospital will begin operation during the summer of 1960.

Particular emphasis has been placed on housing all students and the faculties under one roof so that a high degree of correlative teaching may be obtained. This arrangement affords maximum utilization of both personnel and equipment.

In addition to the science laboratories, the dental clinics, the library, and the modern scientific equipment included in them, a commodious lounge, a number of small rest lounges, locker rooms, bookstore, post office, and eating facilities have been provided for student use. This plan serves to bring the students in all schools into intimate contact with each other and with the faculties, and acquaints them with the research facilities and the actual research programs that are carried on in the Medical Center.

The library, which serves all of the schools and the Teaching Hospital, is located on the second floor of the Administration wing adjacent to the pharmacy quarters. Open-stack shelves are employed to permit students and faculty to browse through the stacks and to utilize the library to the greatest extent. There is seating space for 300 students. At present there are approximately 42,000 volumes in the library with a capacity of 150,000 volumes. About 960 current periodicals are on display for use of the faculty and students. The Medical Center Library resources are augmented by those of the main University Library and interlibrary loan arrangements.

One unique feature of the library is fourteen sound-proof study-rooms. Each room is equipped with a blackboard and serves six students, thus permitting group study. One of the sound-proofed rooms is equipped with a telephone connected with the Hospital call system. This permits hospital staff members to use the library and be on call without annoying others in the library.

The Medical Center has adequate classrooms for each of the schools, some of which may be for general use by any school as the occasion may demand. In addition there are two auditoriums with a seating capacity of 200 and 450 for use by the various schools. Closed-circuit color television can originate at twenty-eight separate points, and can be received at ninety-nine outlets in the building.

Early in the planning of the Medical Center a policy was adopted requiring single departments of instruction for those disciplines common to all schools. Thus, there are single departments of anatomy, biochemistry, microbiology, pathology, pharmacology, and physiology, the faculties of which serve each of the related schools.

The facilities used exclusively by the School of Pharmacy, consisting of sixty-nine rooms located on three floors, and including the pharmacognosy greenhouse, occupy an area of approximately 35,000 square feet. Each of the laboratories is designed to accommodate forty students in a section with the exception of the senior dispensing laboratory which accommodates thirty-two students to a section. A group of the senior students will be receiving hospital pharmacy training in the two pharmacy areas of the Teaching Hospital while the others are in the dispensing laboratory.

The administration offices of the School of Pharmacy are located directly off the main entrance lobby of the Basic Sciences section of the building and include the dean's office, two secretarial offices, and a conference room. The first or main floor facilities consist of twenty-six rooms covering an area of about 14,820 square feet. In addition to the administration suite

there is an administration storage room, four combination staff offices and private laboratories, two instructors' offices, a general pharmacy laboratory, a senior and graduate seminar room with accompanying kitchenette, a faculty reading room, a museum room, a pharmacy administration laboratory, the professional pharmacy, and the senior dispensing laboratory. The professional pharmacy and the senior dispensing laboratory are adjacent to each other and are provided with attractive fronts consisting of plate glass windows and double swinging doors. The corner windows of the entrances to these two laboratories are provided with ninety degree curved plate glass. The prescription laboratory is unique in that there is provided a glass-enclosed instructor's booth elevated about three feet from the floor from which prescriptions may be telephoned to each desk. Typewriters, label drawers, wrapping facilities, and product literature file drawers are provided at the end of the student desk sections. This laboratory is provided with facilities for closed-circuit color television.

The pharmacy facilities on the second floor, located in the north wing of the building, and adjacent to the Medical Center Library, include twenty rooms with a floor space of about 13,450 square feet. These facilities include two combination staff offices and private laboratories, two instructors' offices, two classrooms, an instrument storage room, a photographic dark room, an instrument dark room, the pharmacognosy laboratory, a research laboratory, the pharmaceutical chemistry laboratory and analytical balance room, a specially designed pharmaceutical accounting and pharmacy administration laboratory, a projection room, and an accompanying visual-aids equipment room.

All laboratories in the School of Pharmacy quarters have an adjoining stock room, and an electric service elevator serves each floor from the ground floor stock room. The general pharmacy laboratory has an adjoining "preparation room" where all student preparations are checked.

On the ground floor, where most of the general student facilities are located, such as the locker rooms, the student lounge, the post office, the snack bar and cafeteria, the School of Pharmacy quarters consist of nineteen rooms having an area of approximately 6,650 square feet. The main stock room on this floor is approximately eighty feet by twenty-six feet and is equipped with sliding-glass-door floor cabinets, commodious wall cabinets, and sectional Swartz cabinets. There is an adjoining receiving room where all orders are received, checked, marked, and stored awaiting final distribution to the laboratory stock rooms. These quarters are also provided with a woodworking shop, a walk-in cold storage room, and an alcohol and volatile solvent vault provided with a steel door and combination lock. The vault is equipped with automatic fire control apparatus which closes all vents and releases carbon dioxide gas. Two rooms are provided for the storage of the various kinds of prescription containers. Ample facilities are provided in nine rooms for pilot plant manufacturing of drug preparations. There is an administration office, a control laboratory, a drug grinding room, a granulation and drying room, a tablet compression room, a tablet coating and polishing room, a room for small lot manufacturing of triturates, pills, troches and capsules, a freeze-drying room, a sterile ophthalmic preparations room, and a large laboratory for the manufacturing of extracts, fluidextracts, semi-solids, ointments, creams, emulsions, solutions, elixirs, syrups, and other

types of preparations. This laboratory will be equipped with bottle-washing and bottle-filling apparatus.

The pharmacognosy greenhouse is located on the roof of the north wing of the Basic Sciences Building. The preparation and work room has an area of 1,050 square feet and is equipped with all of the necessary equipment including an electric mixer for preparing soil mixtures. The greenhouse is divided into three compartments having a total area of 1,050 square feet. Each compartment is separated from the others by a door, and each is equipped with separate temperature and humidity controls permitting the growing of plants requiring different climatic conditions. Timing switches permit the automatic control of electric lights in order to permit more hours of light when such conditions are desirable.

With a few exceptions, the fixed furniture of the pharmacy quarters is made of first-quality, matched birch wood.

There are two pharmacy dispensing areas in the Teaching Hospital. One area (36' x 17'), adjoining the office of the Chief Hospital Pharmacist, is located on the first or main floor just off the main hospital lobby and in close proximity to a bank of six-passenger elevators.

The second pharmacy area, located two floors below, consists of nine rooms or work areas as follows: the office and laboratory of the Assistant Chief Hospital Pharmacist (9' x 15'), a compounding and dispensing area (24' x 38'), a laboratory (15½' x 19'), a stain-preparation laboratory (10½' x 19½'), a walk-in cold room (7½' x 7½'), a vault (8' x 15'), a clean-up area (17' x 17'), a bulk-storage room (21' x 23'), and an active storage room (21' x 23').

The two pharmacy areas are connected by an electric service elevator. Pneumatic tube service is provided from each area to all hospital nursing stations.

The Hospital Pharmacy areas were designed by Mr. Grover C. Bowles, Jr., Chief Hospital Pharmacist of the Baptist Memorial Hospital, Memphis, Tennessee, who commented as follows: "If you do not have one of the outstanding teaching hospital pharmacies in the country, I will be greatly disappointed."

The James A. Hamilton Associates, Hospital Consultants, of Minneapolis, Minnesota, were employed prior to the planning of the Medical Center to make a thorough study of the estimated physical facilities required for the proposed educational program at the Medical Center, and as consultants during the planning and construction stages. Schmidt, Garden and Erikson of Chicago, Illinois, were associate architects, and C. E. Silling & Associates of Charleston, West Virginia, were the architects.

The place where the ideals of the profession are nurtured and brought to fullest flower is the college of pharmacy.

Robert P. Fischelis, *Am. J. Pharm. Ed.*, 9, 561 (1945)

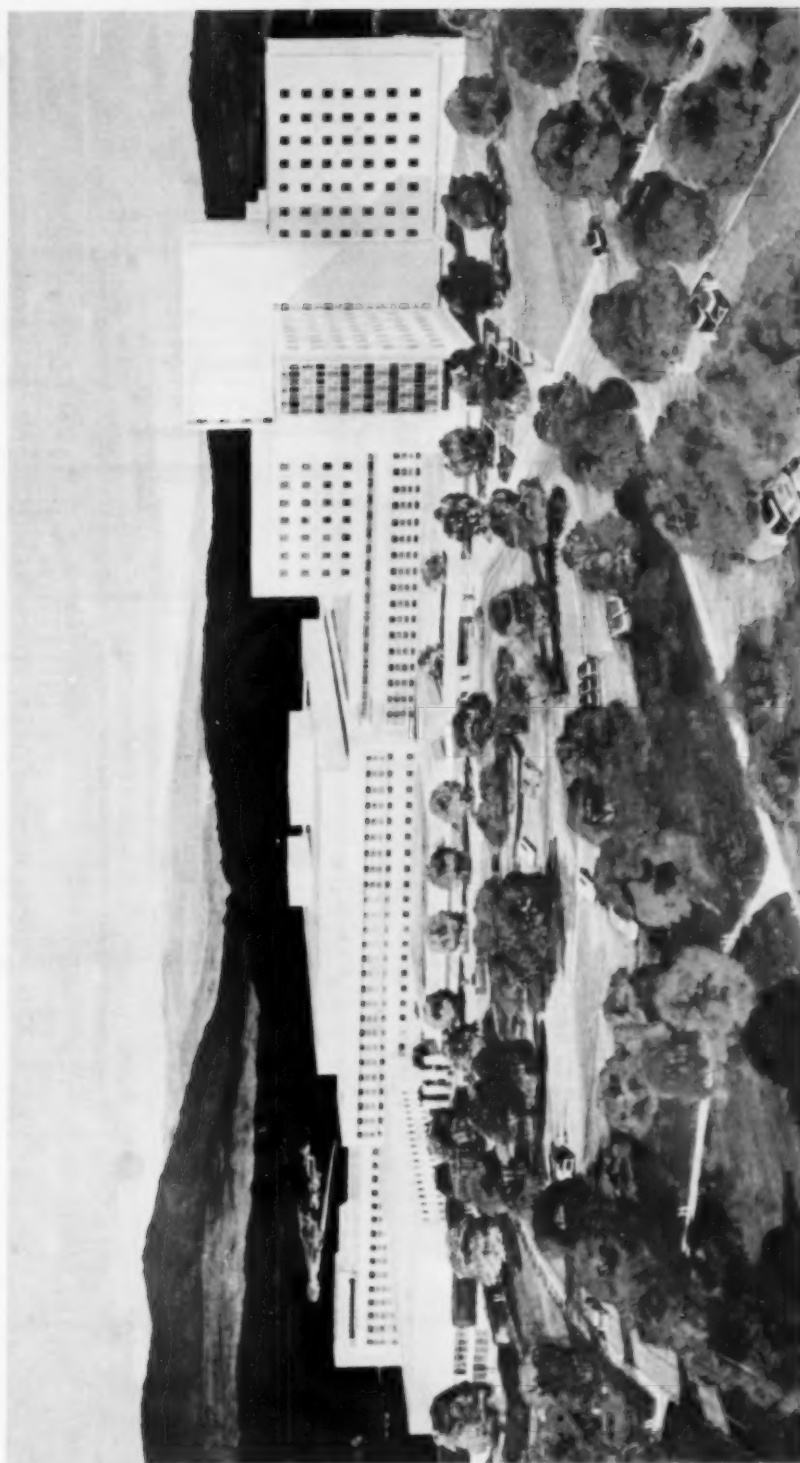


FIG. 1. MEDICAL CENTER BUILDING, WEST VIRGINIA UNIVERSITY

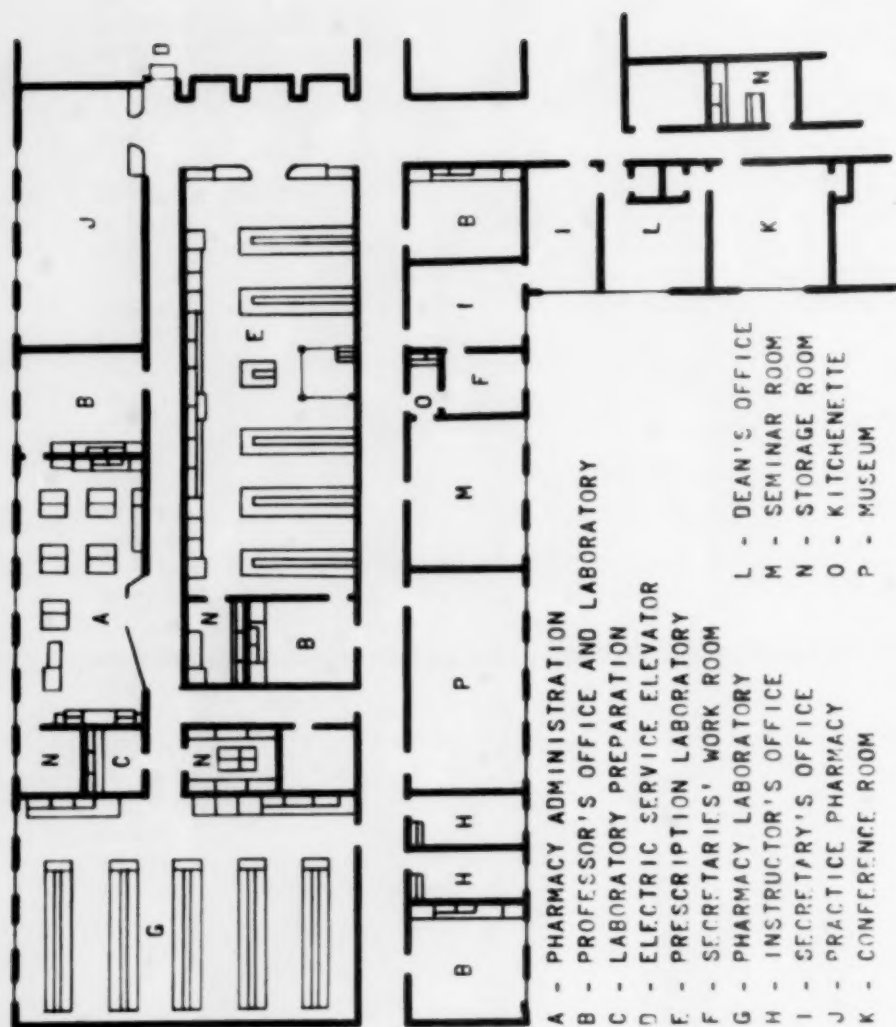
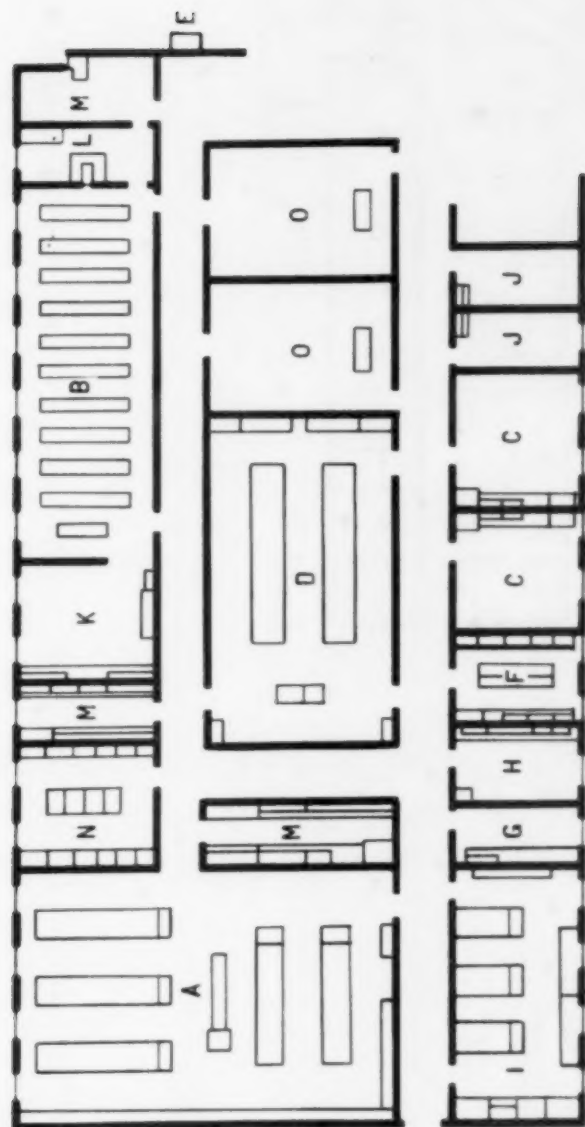


FIG. 2. FIRST FLOOR PLAN, SCHOOL OF PHARMACY, WEST VIRGINIA UNIVERSITY



- A - PHARMACEUTICAL CHEMISTRY LABORATORY
- B - PHARMACY ADMINISTRATION LABORATORY
- C - PROFESSOR'S OFFICE AND LABORATORY
- D - PHARMACOGNOSY LABORATORY
- E - ELECTRIC SERVICE ELEVATOR
- F - INSTRUMENT STORAGE ROOM
- G - PHOTOGRAPHIC DARK ROOM
- H - INSTRUMENT DARK ROOM

- I - RESEARCH LABORATORY
- J - INSTRUCTOR'S ROOM
- K - CALCULATOR ROOM
- L - PROJECTION ROOM
- M - STORAGE ROOM
- N - BALANCE ROOM
- O - LECTURE ROOM

FIG. 3. SECOND FLOOR PLAN, SCHOOL OF PHARMACY, WEST VIRGINIA UNIVERSITY

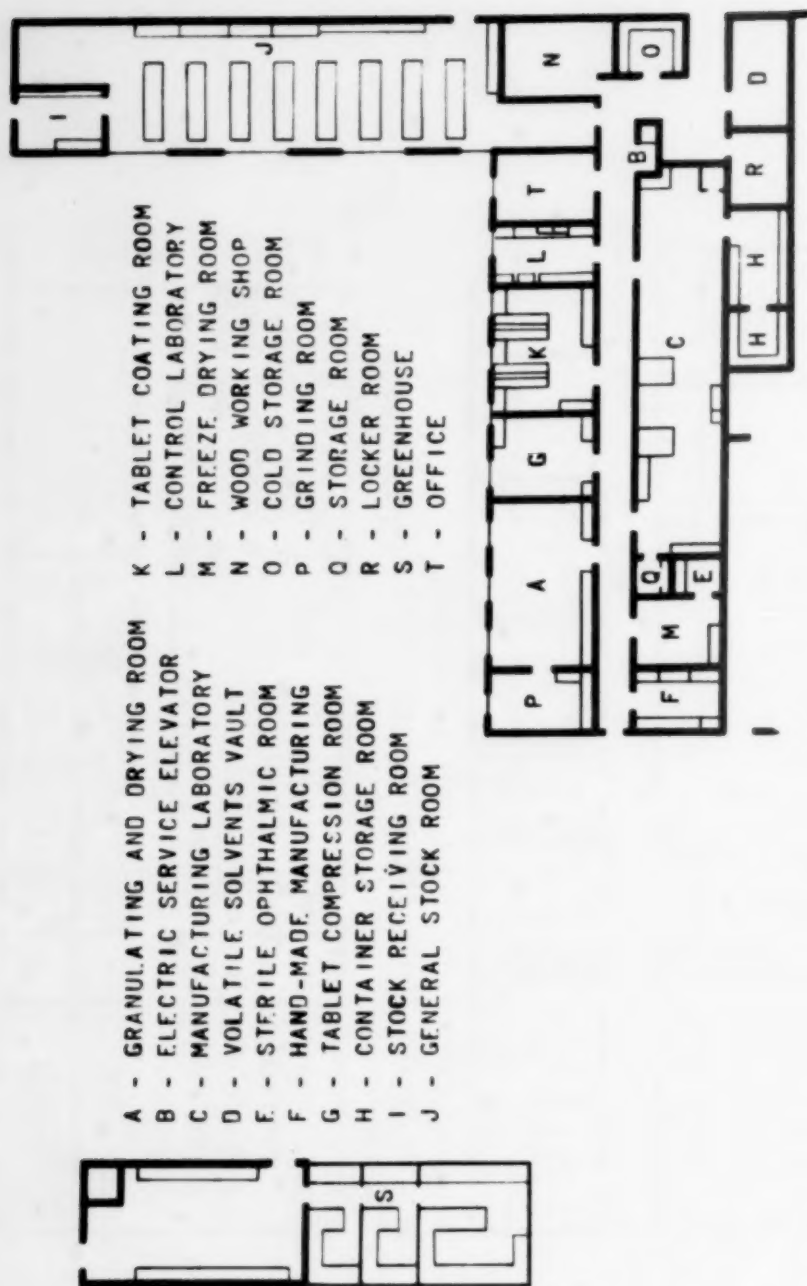


FIG. 4. GROUND FLOOR PLAN, SCHOOL OF PHARMACY, WEST VIRGINIA UNIVERSITY (GREENHOUSE IS LOCATED ON THE ROOF OF THE NORTH WING)

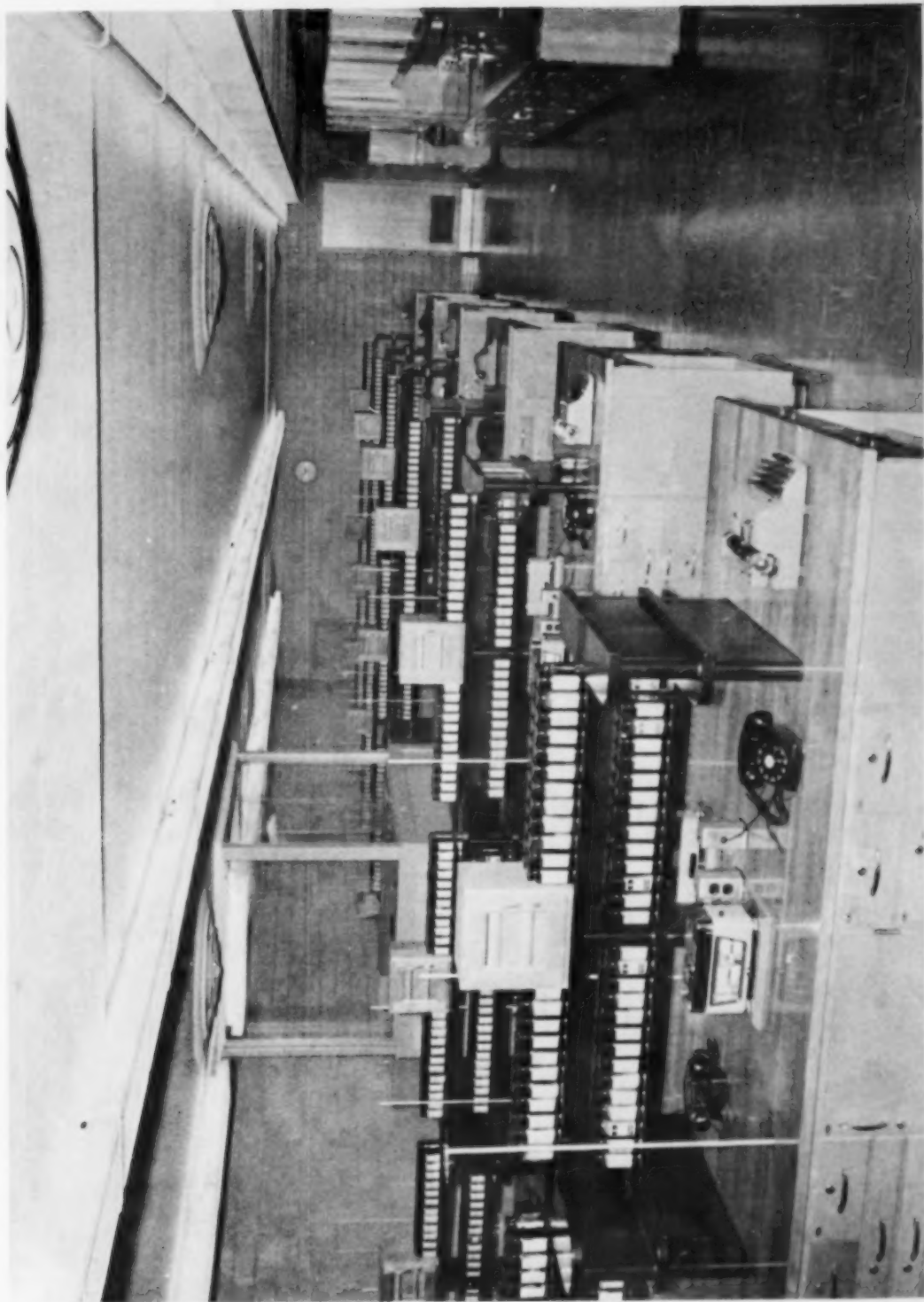


FIG. 5. PRESCRIPTION LABORATORY, SCHOOL OF PHARMACY, WEST VIRGINIA UNIVERSITY

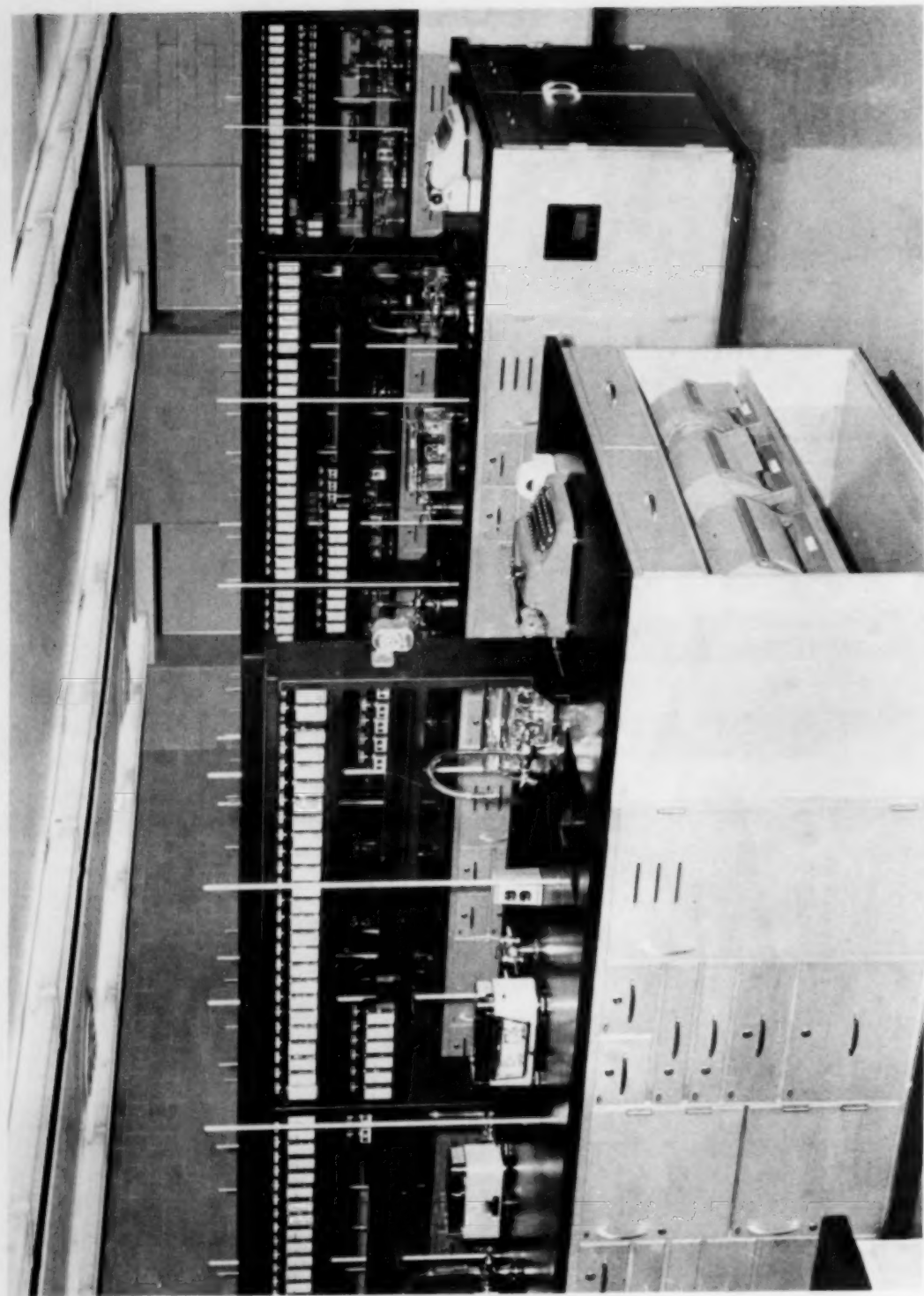


FIG. 6. GENERAL PHARMACY LABORATORY, SCHOOL OF PHARMACY, WEST VIRGINIA UNIVERSITY



FIG. 7. PHARMACOGNOSY LABORATORY, SCHOOL OF PHARMACY, WEST VIRGINIA UNIVERSITY

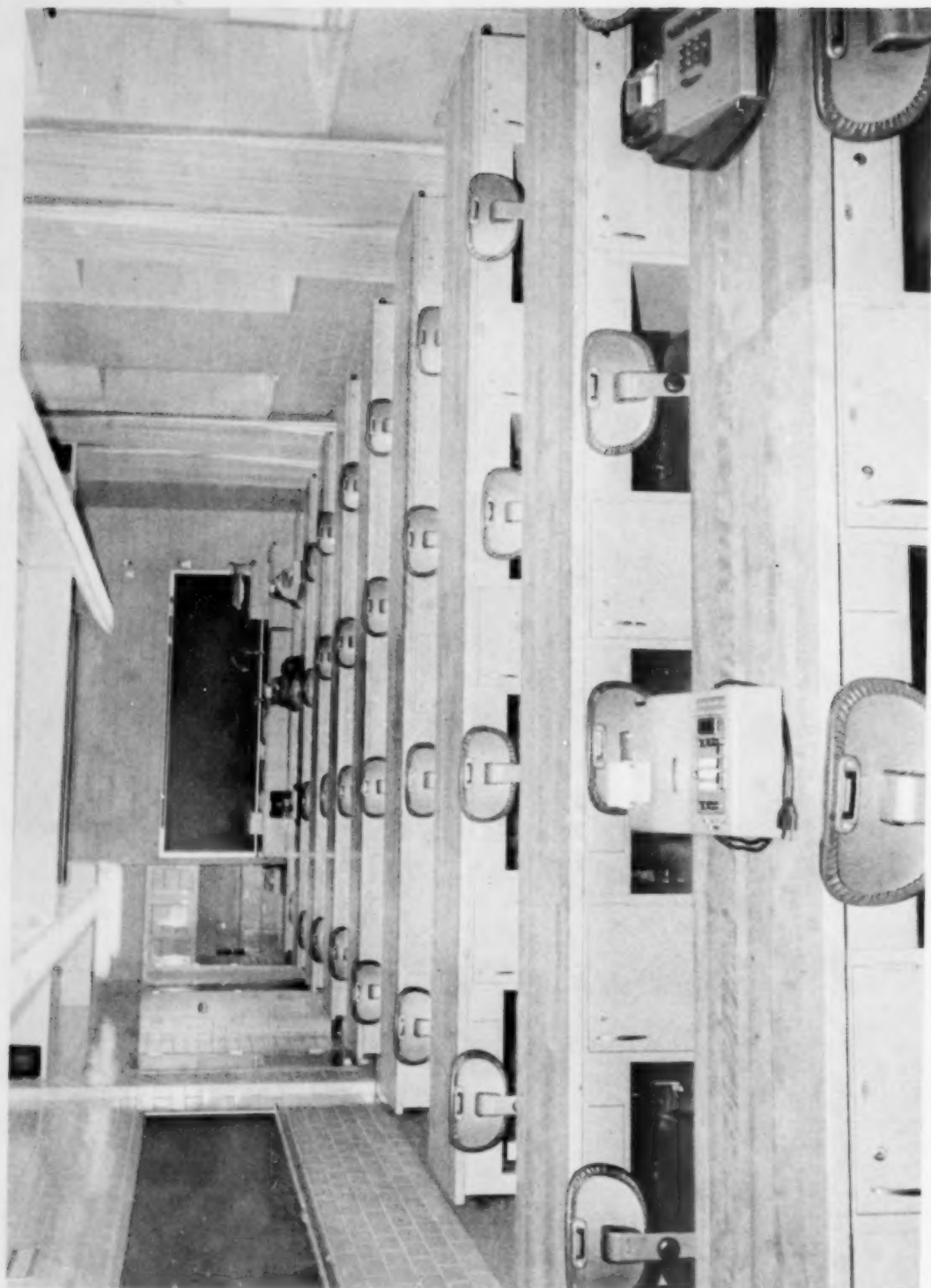


FIG. 8 PHARMACY ADMINISTRATION LABORATORY, SCHOOL OF PHARMACY, WEST VIRGINIA UNIVERSITY

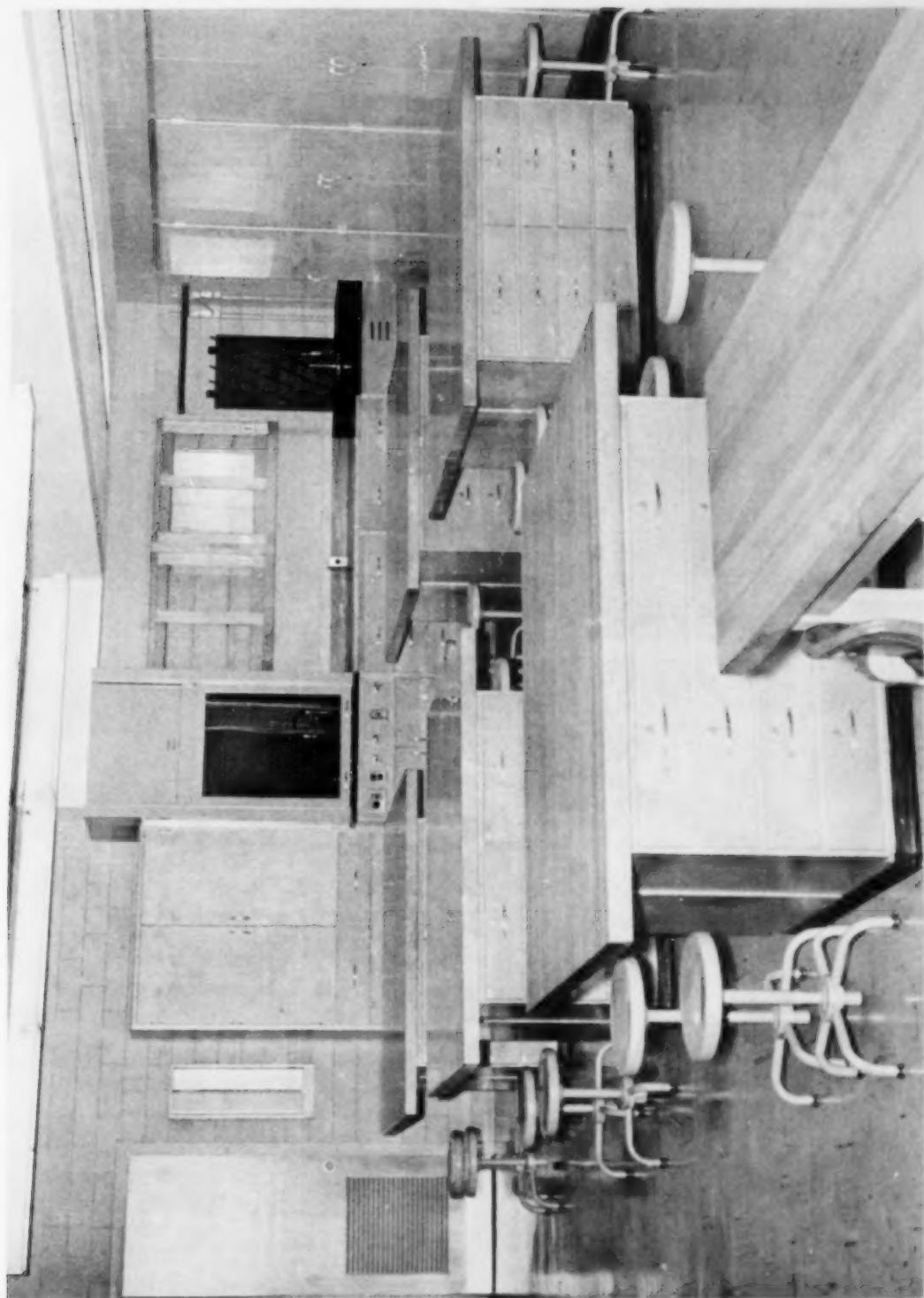


FIG. 9. PHARMACY ADMINISTRATION LABORATORY, SCHOOL OF PHARMACY, WEST VIRGINIA UNIVERSITY

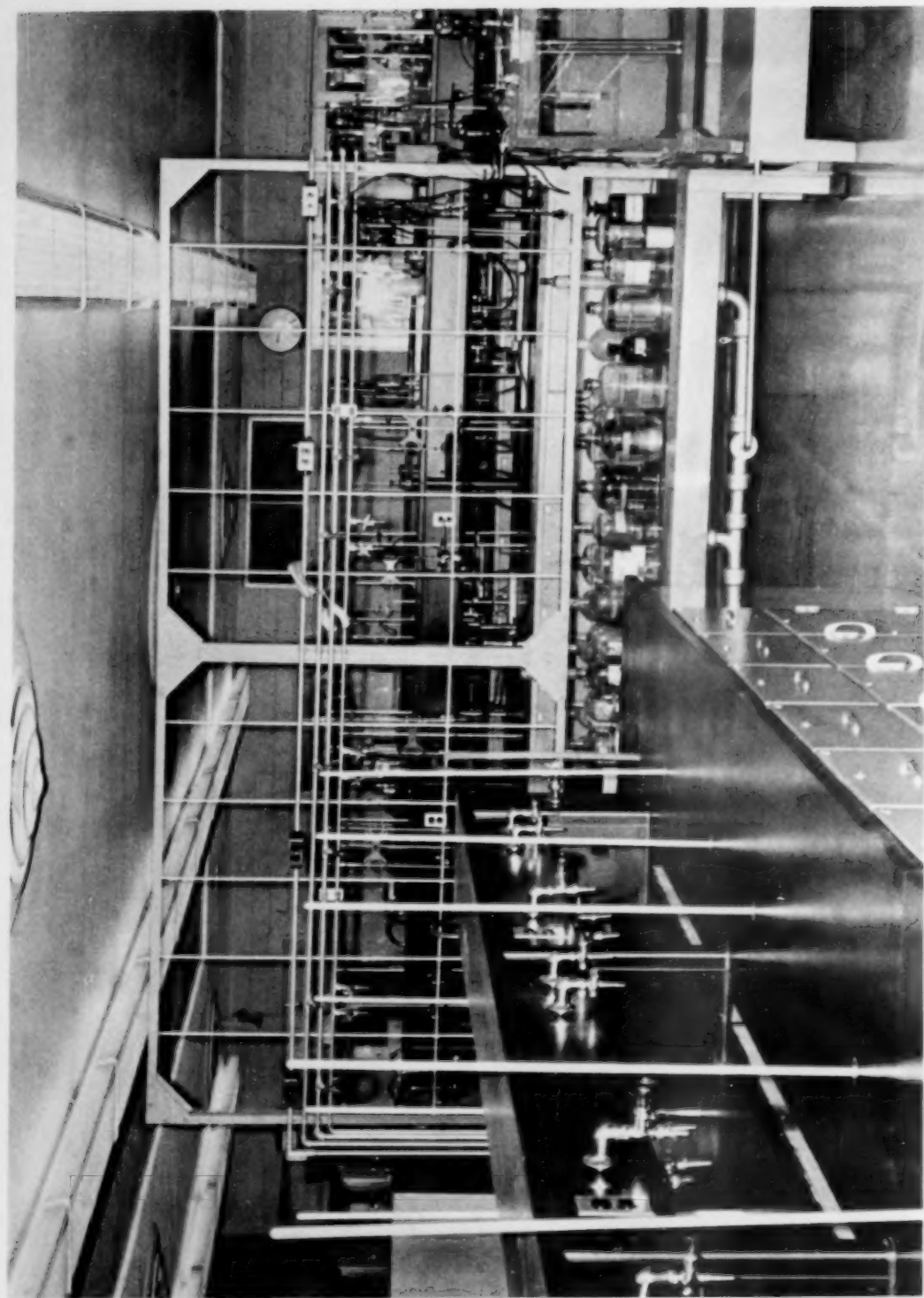


FIG. 10. PHARMACEUTICAL CHEMISTRY LABORATORY, SCHOOL OF PHARMACY, WEST VIRGINIA UNIVERSITY

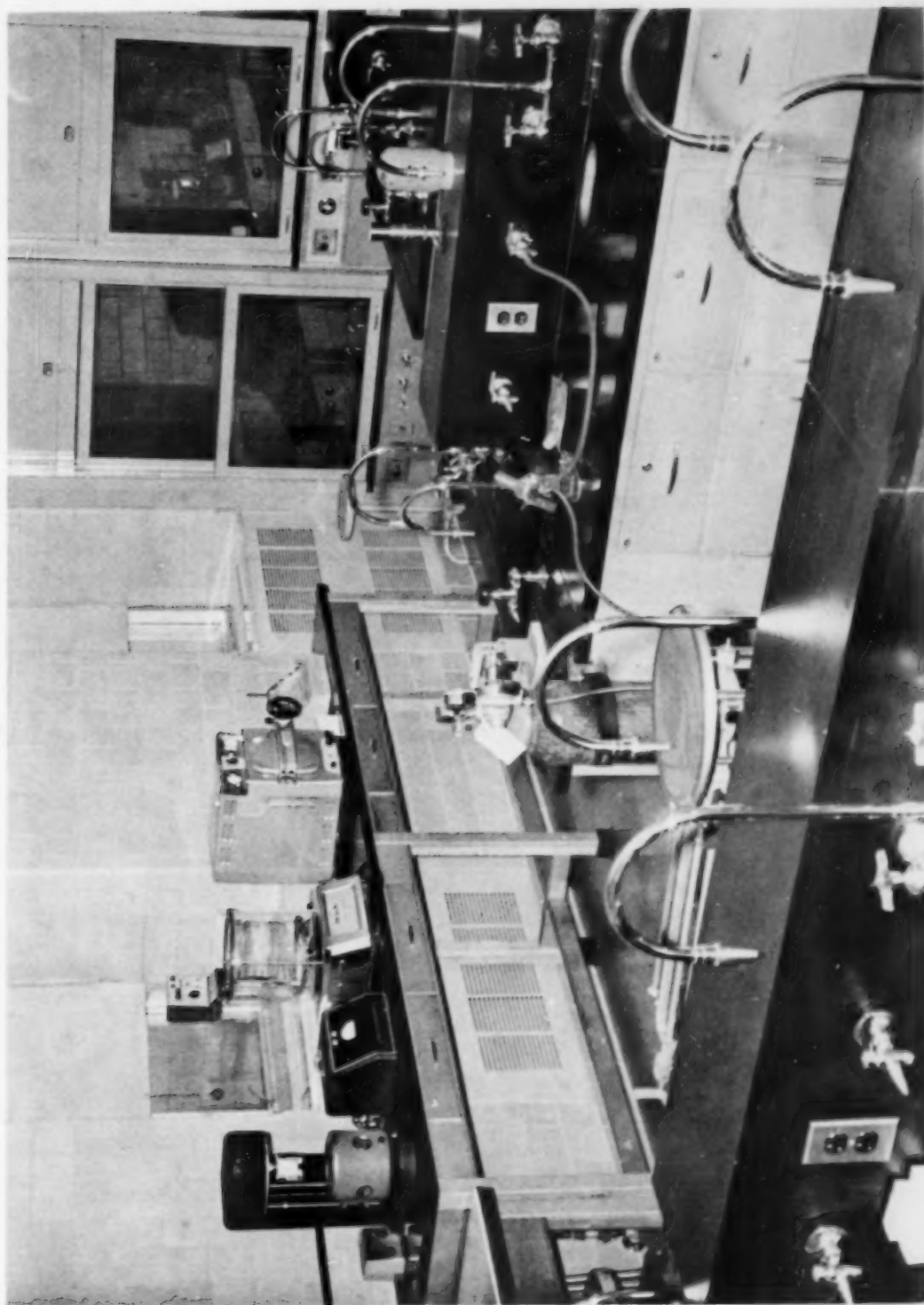


FIG. 11. CORNER VIEW OF RESEARCH LABORATORY, SCHOOL OF PHARMACY, WEST VIRGINIA UNIVERSITY

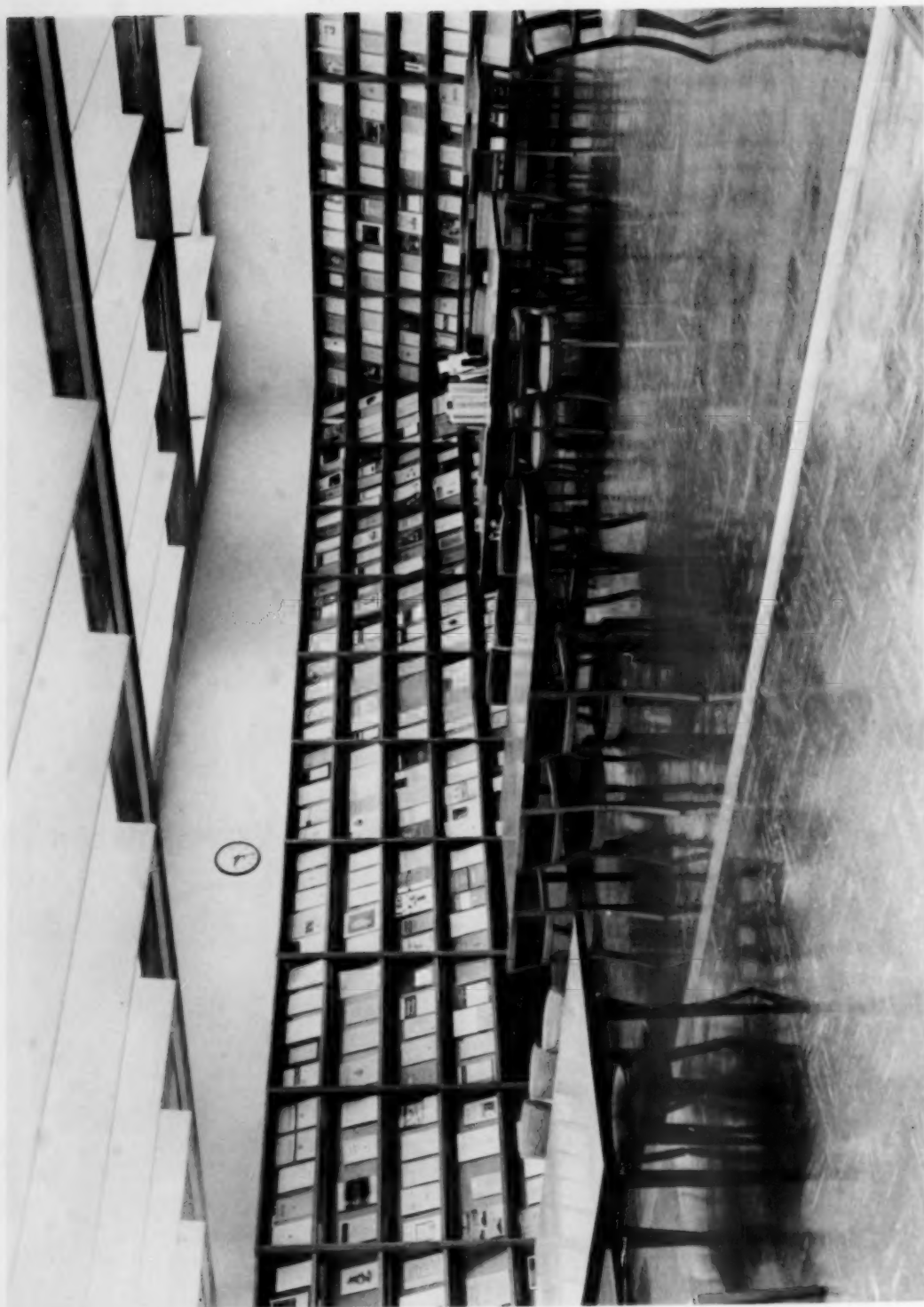


FIG. 12. JOURNAL SECTION OF MEDICAL CENTER LIBRARY, WEST VIRGINIA UNIVERSITY

THE UNIVERSITY OF NORTH CAROLINA SCHOOL OF PHARMACY

E. A. BRECHT

The School of Pharmacy of the University of North Carolina moved into its new building on November 16, 1959. It is located in the southwest quadrant of the campus which is occupied by the Division of Health Affairs, composed of the Schools of Pharmacy, Dentistry, Medicine, Nursing, and Public Health, and the North Carolina Memorial Hospital. The area is adjacent to departments of the natural and physical sciences: zoology, chemistry, and physics. These will be joined by the new buildings now financed for botany and geology.

It is impossible to include every detail of interest in the space available here; preference is given to information of greatest interest to other colleges of pharmacy now planning new buildings or additions. This may in some measure repay the aid and cooperation we received from other schools.

The most important work is planning, with no detail too small for careful attention. The need for a larger school and more pharmacists in North Carolina was recognized in 1943 by the faculty under the leadership of Dean J. G. Beard when the war had reduced the student body to half of its normal size and half of the pharmacy students were women.

Space needs were first detailed in 1948 during the deanship of the late Dr. M. L. Jacobs. A building was planned for 60,000 square feet at a total cost of \$966,000 to graduate seventy students per year. More urgent capital improvements on the campus and attempted legislation against pharmacy combined to prevent an appropriation during the next eight years.

In 1956 pharmacy became the first building on the campus for which a planning fund was made available when a contract of \$25,000 was made with a firm specializing in space utilization. The handsomely bound report and a fourth set of schematic plans are the best evidence that the firm was not only uninformed but also uninterested in the ordinary and specialized facilities required for a school of pharmacy. The greatest value materialized when the challenge was accepted by the faculty to undo poor planning and gain the required facilities by replanning space utilization more efficiently.

The faculty's work began with the practice evaluation of check sheets in the new buildings on the campus, followed by trips, with check sheets and cameras, by teams of two faculty members each to new buildings or facilities at Butler University, the University of Illinois, Howard University, Temple University, the University of Connecticut, and the research building at Eli Lilly and Company. Also, working experience at nine additional colleges of pharmacy was evaluated, and later visits were made to new pharmacy buildings at Alabama Polytechnic Institute, the University of South Carolina, and the University of Kentucky. Good ideas were copied from each of these places. The excellence of the architects, Holloway-Reeves and Associates, was a complete contrast to the space utilization firm. Every idea and suggestion from the faculty was considered, and none was rejected except when something better was available. Technical construction details

were referred to the faculty only when a choice of equivalents had to be made. The twenty-four-page color schedule for interior decoration was a good example of this competence. It was accepted without change, and the building's interior color decoration is now the source of compliments for its attractive, clean appearance.

In considering the following details of the building it must be realized that only professional subjects are taught within the pharmacy building, and academic subjects are taught in the respective departments of the university without the designation of any class sections "for pharmacy students." The basic medical sciences are taught in the School of Medicine to pharmacy sections, and appropriations for these latter courses are included in the pharmacy budget.

The new pharmacy building is Georgian style constructed of brick-faced reinforced concrete. The basic building is 80 by 240 feet, three stories high. It is designed for 473 undergraduate students in the four professional years of the curriculum and thirty graduate students. The calculated area, outside dimensions, is 69,240 square feet which includes mechanical space and a one-third allowance for unfinished space in the basement and attic. There is 10,000 square feet of unfinished space in the basement for future utilization.

The building was completed within appropriations of \$940,000 for construction and \$400,000 for equipment. The equipment fund included \$50,184 as a matching grant for research facilities in a health science from the National Institutes of Health. The largest equipment items were \$255,317 for casework (laboratory desks, hoods, library shelves and stacks, classroom seats, etc.), \$26,237 for the sterile solution room, \$16,559 for office furniture, and \$3,563 for library furniture. It also included microscopes, some balances, some research equipment, etc. The cost of the building was \$13.29 per square foot which increased to \$17.54 with fixed equipment included. A construction period of 540 days was required between ground breaking and occupancy.

In the general construction the best single feature is a light-colored glazed block wainscot, fifty-three inches high, in all traffic and laboratory areas to prevent marring and provide easy maintenance. All horizontal plumbing is exposed and is well concealed by black ceilings and lowered fluorescent lights. Painted cinder block walls are proving to be excellent in economy, appearance, and acoustical properties. All windows have pivot sashes which makes possible the cleaning and maintenance of both sides from the inside of the building.

Forced ventilation with filtered air is recirculated in fifteen zones classified according to type of function. Heat is obtained from hot water heated by steam from the university power plant. While there is no cooling for the summer, any zones or the whole building can be air conditioned merely by the installation of compressor units according to required capacity. All air ducts and thermostats are intended for both heating and cooling.

The locations of functional areas are evident from the floor plans, Figures 2 and 3. Comments here are limited to items of special or unusual interest.

Room functions on the main floor were assigned on the basis of greatest traffic in and out of the rooms to minimize stair climbing. The halls have four built-in cases for permanent displays and fifty feet of museum cases eighty inches high. A sense of spaciousness on the main floor is increased

by a large information window to the secretaries' office faced by a large look-through museum window to the library.

All classrooms are equipped for audio-visual instruction and are interconnected with ducts for closed-circuit television. A special type of Venetian blind is most efficient and attractive. These are capable of blacking out daylight. Fixed pedestal seats are arranged for vertical loading to give better privacy between seats and to keep their backs from being used as footrests.

The retail laboratory is designed for movable fixtures where pharmacy administration classes can learn store layouts, traffic control, inventory systems, etc.

Four large undergraduate laboratories dominate the second floor, with the central stock room and balance room centrally located. At the outside end of each laboratory is one faculty office and two faculty office-laboratories. This arrangement doubles the function of floor space as the work aisle for the last undergraduate desk and hallway for the offices.

Each laboratory has a lecture desk, preparation room, and safety showers. The size and division of laboratory desks is uniform in the laboratories. However, the desk tops vary: Alberene in pharmaceutical chemistry, black laminated fiberwood in pharmacy and advanced pharmacy, and green laminated fiberwood in dispensing. Each station has three student lockers, four stations to the side of a desk. Each student has sixty inches of work space and a pullout ointment slab. Each two students share a sink. Each student has mixed hot and cold water, distilled water, an aspirator for vacuum, cold water for condensers, steam, gas, and electricity. All sinks are ceramic, with rounded corners and without seams. Each pair of stations shares a common cupboard for ringstands, burners, and steambaths to reduce the quantity of this unbreakable equipment by two-thirds. Waste jars are kept within the common cupboard. All laboratory desks are oak finished in a light natural color. Metal is minimized to avoid corrosion. Locker doors cover all drawers so that only one lock is required, and the doors open 180 degrees so that they may be left open during a work period.

The pharmacognosy laboratory was placed on the third floor, farther from the stock room because less general stock room service is required for this course. The inside greenhouse at the end of this laboratory attracts unusual interest from visitors. Every laboratory was designed on a multi-purpose basis. The traditional thirty-one-inch height for a pharmacognosy desk was increased to the thirty-seven inches standard for all laboratory desks to gain four lockers per station for this type of work plus a chemical-type locker. This laboratory would suffice for bacteriology, physiology, or biochemistry in addition to pharmacognosy, if necessary.

The most interesting features in the manufacturing laboratory are two central utility stations and the cleanup station into which dirty heavy equipment can be wheeled and cleaned with mixed hot water and steam. Or the curtains can be pulled, the exhaust fan turned on overdrive, and thus dust from milling or granulating can be kept from the laboratory.

The north half of the third floor is reserved for graduate students with seventeen two-man laboratory-offices and the following central laboratories: constant temperature and humidity, hydrogenation, instruments, optical,

darkroom, walk-in refrigerator at 5° and -20°, and a shop for making equipment. Special equipment is also housed in this area.

The attic contains an automatic water still, the air-handling equipment, and the exhaust fans for an extensive hood system. Polyvinyl chloride plastic pipes are used for the distilled water system; all taps are lined with tin.

The halls on the second and third floors are used for functional space; the laboratories are marked as a part of the exit system between the center and ends of the building. Carbon dioxide extinguishers are placed throughout the building, and general purpose gas masks are located in the areas of potential hazard.

The efficiency of design is illustrated by the calculation that auxiliary space (halls, stairs, and toilets) is only 23.5 per cent of functional space (laboratories, classrooms, offices, etc.). Science buildings average 35 to 40 per cent.

In concluding, another "first" on this campus was the inclusion of the casework in the architect's contract. This provided design suited to our needs, specification to independent standards, and, most of all, competent inspection and determination of acceptability of all installations.

The great problem of our time is moral, intellectual, and spiritual. With a superfluity of goods we are sinking into poverty. With a multitude of gadgets we are no happier than we were before. With a declining death rate we have yet to discover what to do with our lives. With a hatred of war we are now deeply engaged in the greatest war in history. With a love of liberty we see much of the world in chains.

Robert Maynard Hutchins, *Am. J. Pharm. Ed.*, 13, 129 (1949)



FIG. 1. SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA

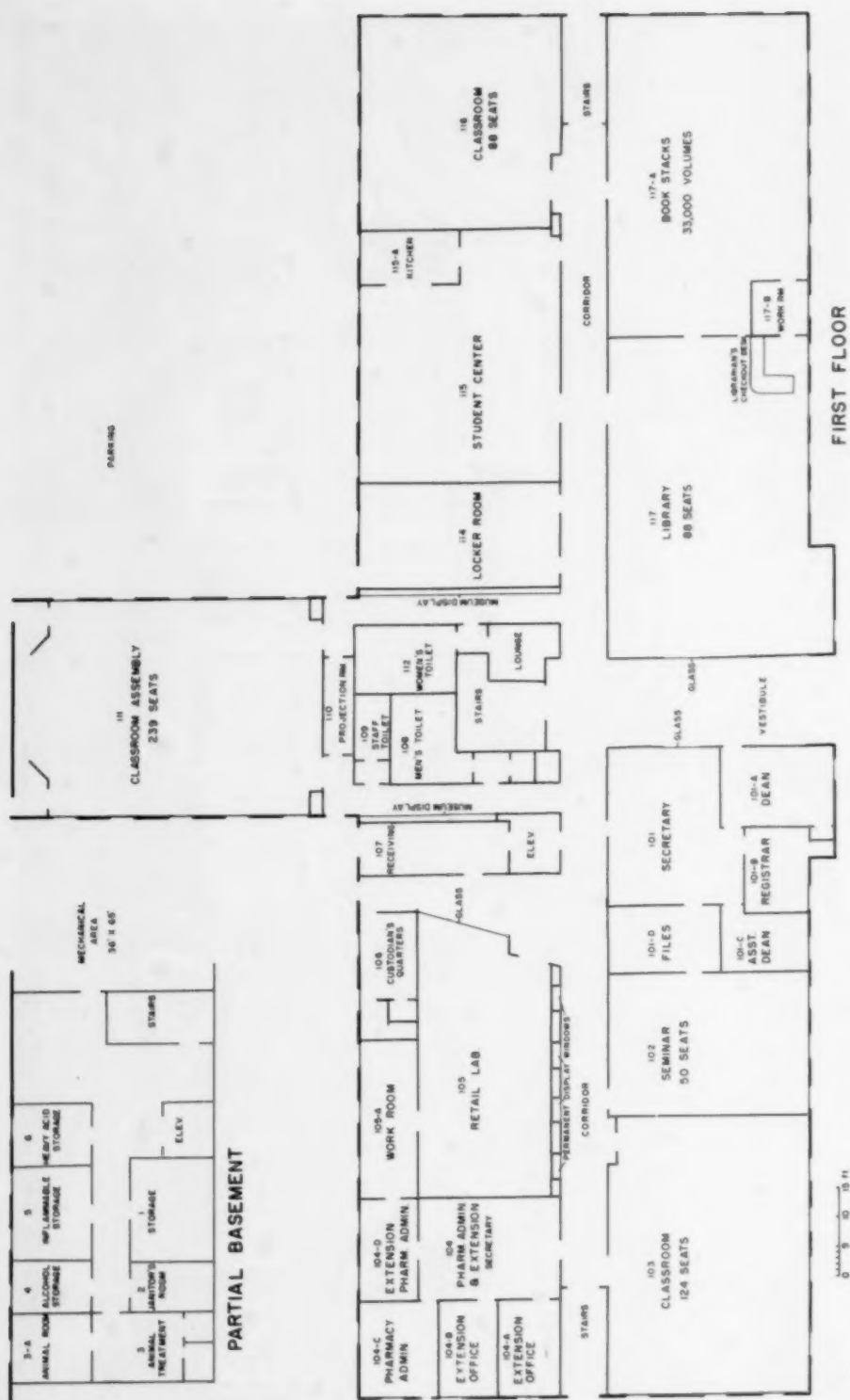


FIG. 2. FIRST FLOOR AND PARTIAL BASEMENT PLANS. SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA

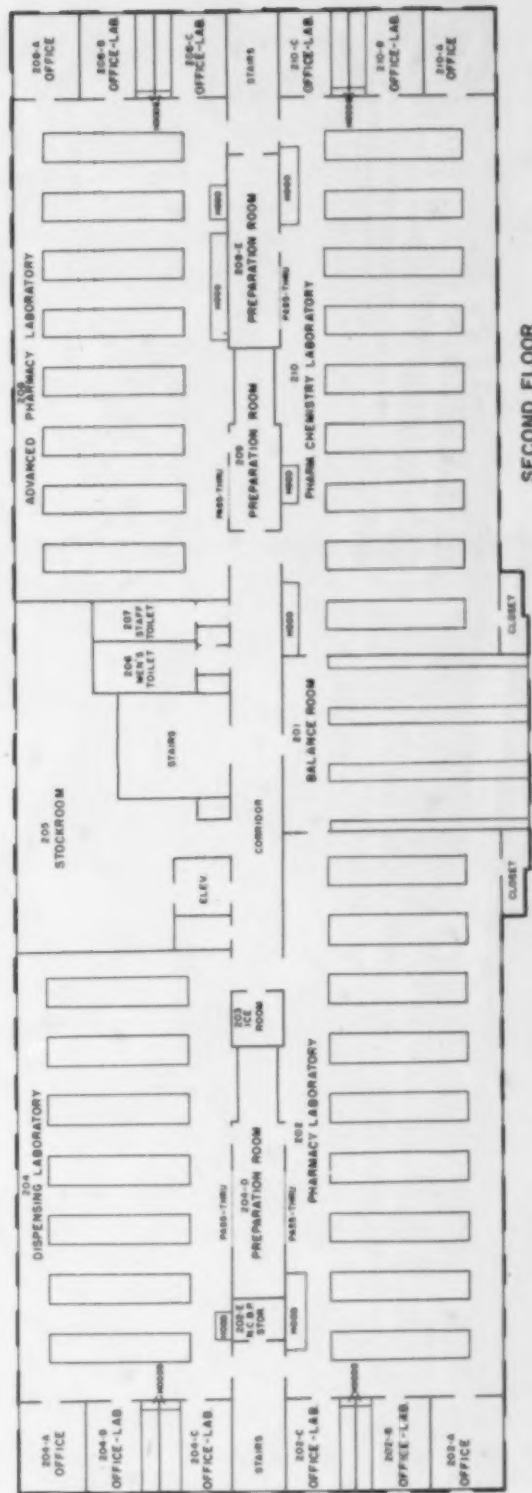
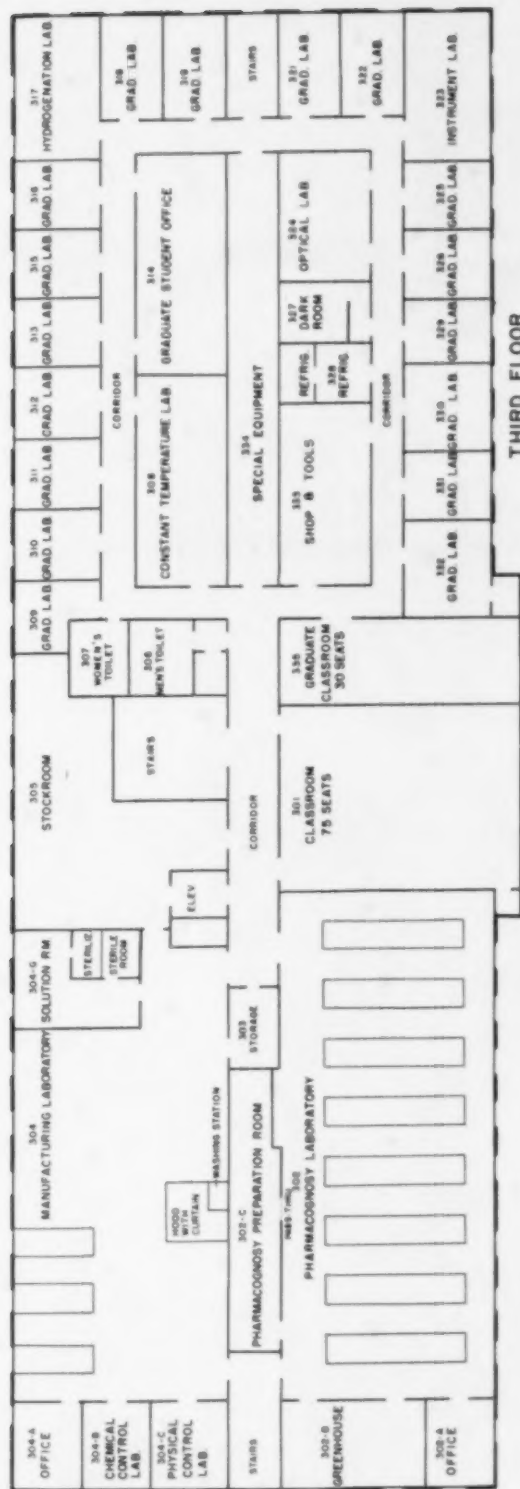


FIG. 3. SECOND AND THIRD FLOOR PLANS. SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA



FIG. 4. FRESHMAN-SOPHOMORE LABORATORY, SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA



FIG. 5. PHARMACOGNOSY LABORATORY. SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA



FIG. 6. MANUFACTURING LABORATORY, SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA

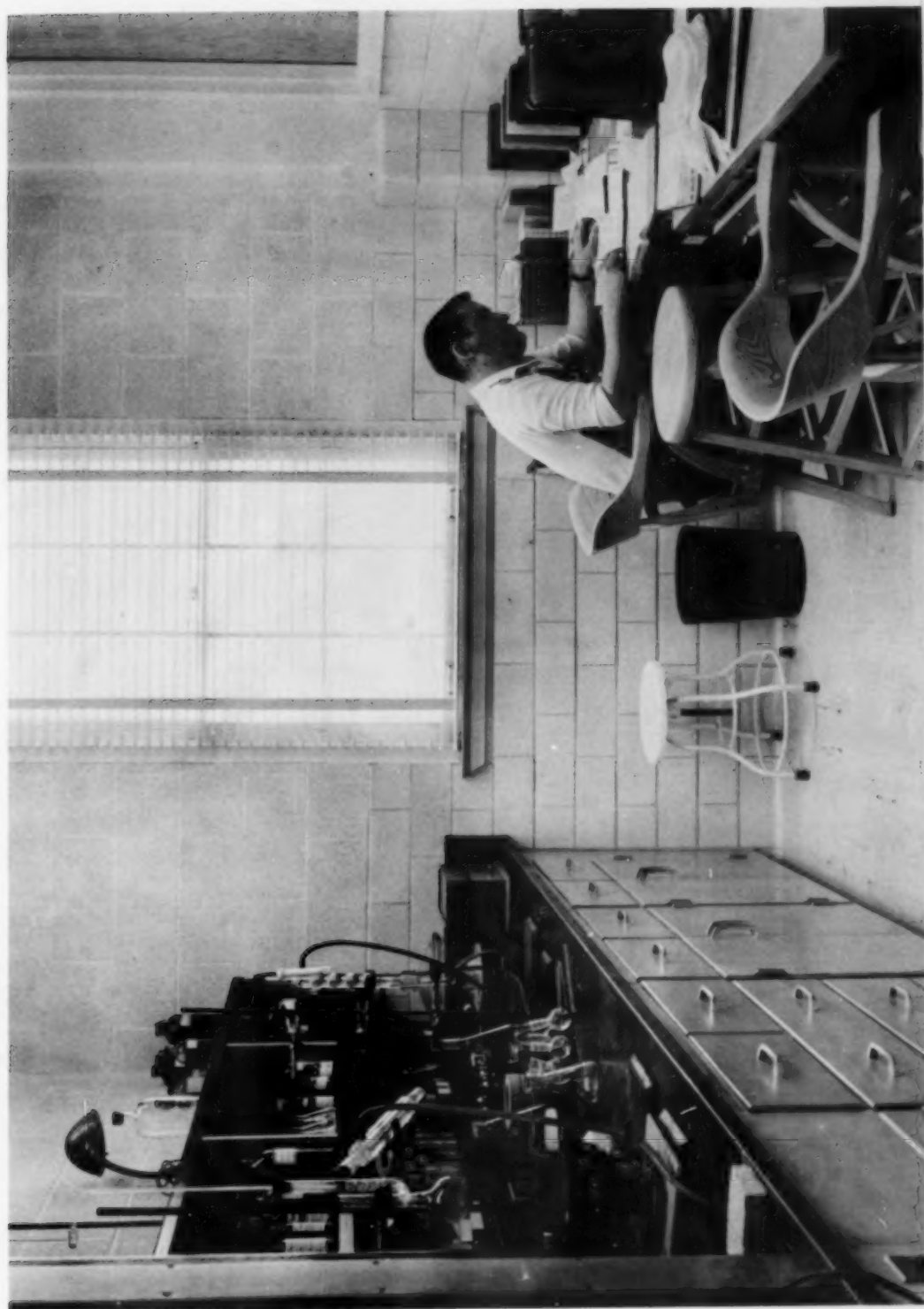


FIG. 7. GRADUATE LABORATORY-OFFICE FOR TWO STUDENTS, SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA



FIG. 8. PHARMACY LIBRARY, SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA



FIG. 9. ONE OF THE TWO MUSEUM CASES IN THE HALLS TO THE ASSEMBLY ROOM, SCHOOL OF PHARMACY.
UNIVERSITY OF NORTH CAROLINA



FIG. 10 LECTURE ROOM, SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA



FIG. 11. PHARMACY LIBRARY, SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA

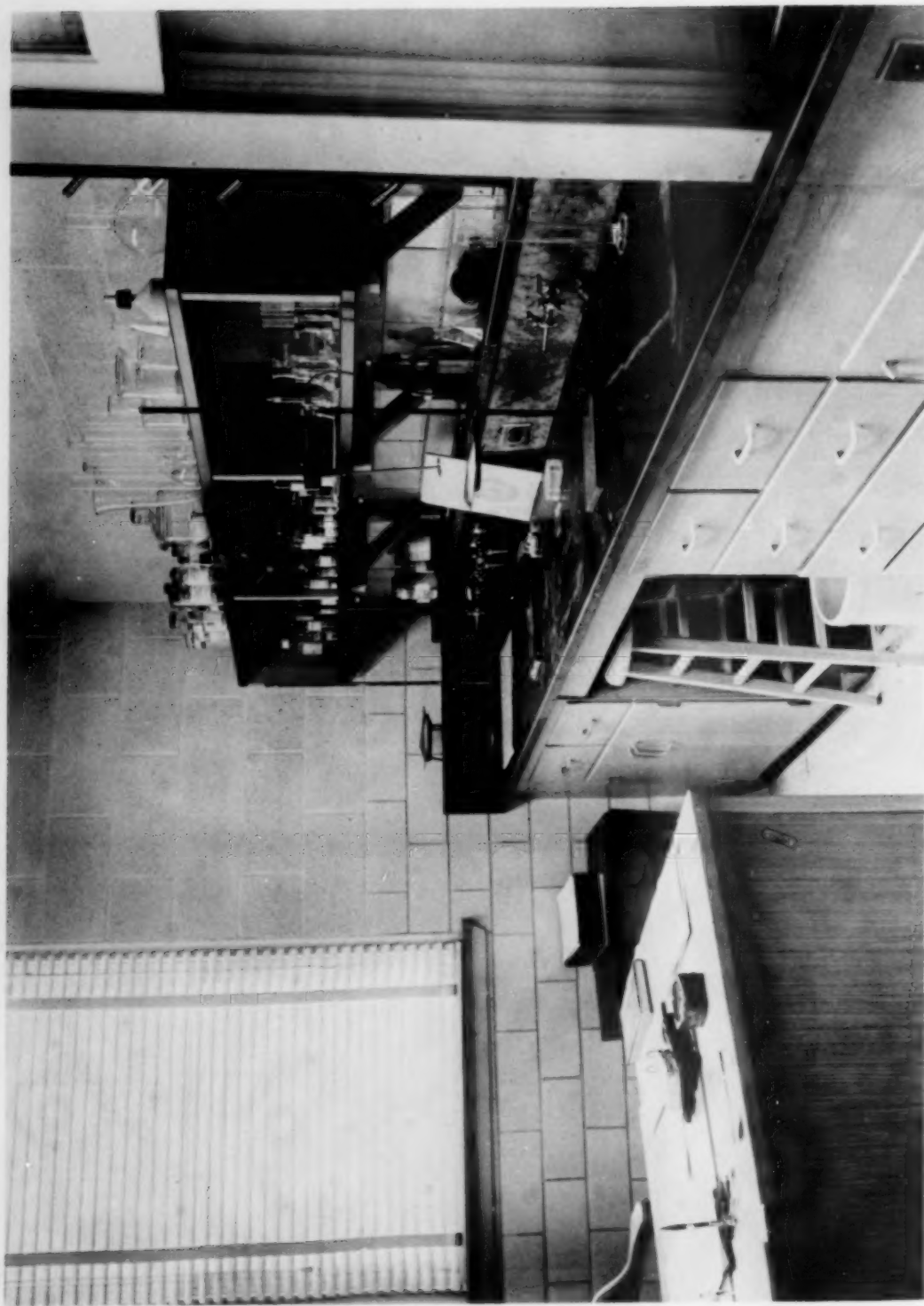


FIG. 12. FACULTY OFFICE-LABORATORY, SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA

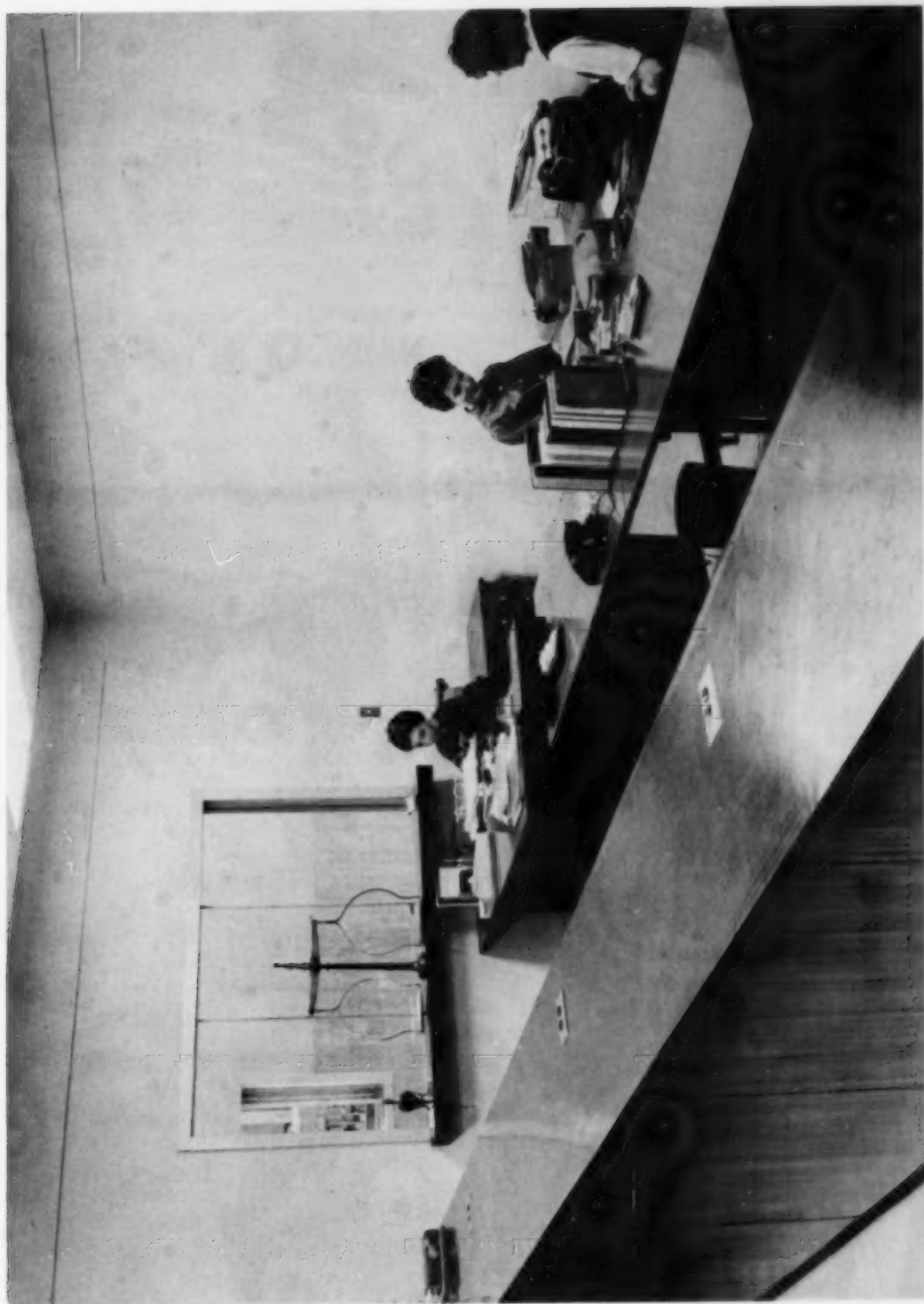


FIG. 13. SECRETARIES' OFFICE, SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA



FIG. 14. DISPENSING LABORATORY, SCHOOL OF PHARMACY, UNIVERSITY OF NORTH CAROLINA

LYMAN HALL

JOSEPH B. BURT

The new home of the College of Pharmacy of the University of Nebraska, named in honor of the founder and first dean of the College, was completed and occupied during the summer of 1958. Appropriate dedication ceremonies were held on Thursday, October 2, 1958, with speakers for the occasion including: Dr. Robert L. Swain, Chairman of the Council, The American Pharmaceutical Association; Dr. George D. Beal, President of The American Council on Pharmaceutical Education; Dr. Louis C. Zopf, President of the American Association of Colleges of Pharmacy; Dr. Robert A. Hardt, President of Armour Pharmaceutical Company, representing the alumni; Mr. James E. Hamik, '59, representing the student body; Dr. Clifford M. Hardin, Chancellor of the University of Nebraska; and Mr. Charles Y. Thompson, President of the Board of Regents.

Lyman Hall is located on the southeast corner of Fourteenth and Vine Streets, an especially desirable site since it faces directly upon Memorial Mall, one of the most attractive vistas on the campus. At the opposite end of the Mall is the Memorial Stadium. This space will be kept free from buildings for aesthetic reasons, and represents the largest open space remaining on the City Campus.

Professor Linus Burr Smith, University Architect and Chairman of the Department of Architecture, conceived the original design of the building and was responsible for the development of its schematics. The Leo A. Daly Co., Architects and Engineers, of Omaha, St. Louis, and Seattle, developed the detailed plans and specifications. The Assenmacher Construction Co., of Lincoln, was awarded the general contract.

The building consists of three floors and a penthouse at the fourth-floor level, and was designed to house the activities of the College of Pharmacy and the Department of Bacteriology of the College of Arts and Sciences, the latter occupying the third floor with the remainder of the space assigned to the College of Pharmacy.

The building is of new and modern design, featuring an attractive facade which is characterized by the incorporation of *brises-soleil*, or louvers extending the full length of the building at the second- and third-floor levels.

The attractiveness of the design is further enhanced by the irregular rather than rectangular outline of the first floor, which has a tapered design for the west half of the building, with extensions—at this level only—at both ends of the east half of the building. Adding to the attractiveness of the design is a monitor on the rooftop which serves the useful purpose of housing the numerous fans and blowers needed for the ventilating and heating system. These features, together with a slight overhang of the two upper floors, accent the design and focus attention upon the dominant architectural element of the structure represented by the use of louvers.

Construction is of brick over structural steel, with generous use of glass providing for excellent natural light. With the exception of the second- and third-floor levels at the ends of the building, windows run continuously

around the building at each floor level, separated vertically by prefabricated spandrels.

At the ground level, the maximum length of the building is 264 ft., with a width of 47.5 ft. This accounts for a total floor space of approximately 39,200 sq. ft., of which about 12,100 sq. ft. is represented by the third floor assigned to the Department of Bacteriology, leaving about 27,100 sq. ft. to house the activities of the College of Pharmacy.

All corridors and animal quarters are walled with ceramic tile. Floating acoustical panels are used for all ceilings, giving immediate access to all plumbing, ventilating ducts, and wiring. Fluorescent lighting is used throughout the building. Service equipment includes an automatic water still in the penthouse, with distilled water piped to all floors, a large incinerator on the penthouse floor, and a freight elevator. A small greenhouse is located at the south end of the building at the fourth-floor level, together with adjacent working space which serves as a headhouse.

Original specifications called for the building to be completely air-conditioned and all of the ducts and blowers necessary for this purpose were installed. However, since this building was the last of a series to be included in the then current ten-year mill levy program (which has since been renewed by the Nebraska Legislature), it became necessary to limit the number of compressors, cooling coils, and the capacity of the water-cooling towers located in the penthouse. Approximately one third of the space in the building is now air-conditioned. However, a grant of funds from an outside source, together with additional funds as these can be made available from the building fund levy as it accumulates, should make provision for the necessary equipment to provide air-conditioning for the entire building, possibly in separate stages as the funds become available.

Four classrooms and a seminar room are provided in the building, all equipped with light-proof shades for the use of visual aids.

A special feature of the building is the Student Lounge on the first floor, furnished and decorated by the Rufus A. Lyman Memorial Fund, representing contributions from alumni and friends of the College of Pharmacy. The Fund also provided a portrait of Dean Lyman which was unveiled at the dedication exercises and which hangs in a place of honor in the corridor near the Dean's office on the first floor.

A listing of the rooms occupied by the College of Pharmacy follows:

First Floor

101	Product research and development laboratory	109	Lecture room
101A	Milling room	110	Faculty office
101B	Distilling room	111	Faculty office
101BA	Catalytic reduction room	112	Supply room
102	Faculty office	113	Rufus A. Lyman Memorial Student Lounge
103	Supply room	114	Office supplies room
104	Mechanical room	115	Mechanical room
105	Women's rest room	116	Dean's reception room
106	Custodian's room	116A	Dean's office
107	Men's rest room	117	Advanced pharmaceutical chemistry laboratory
108	Balance room and surplus storage		

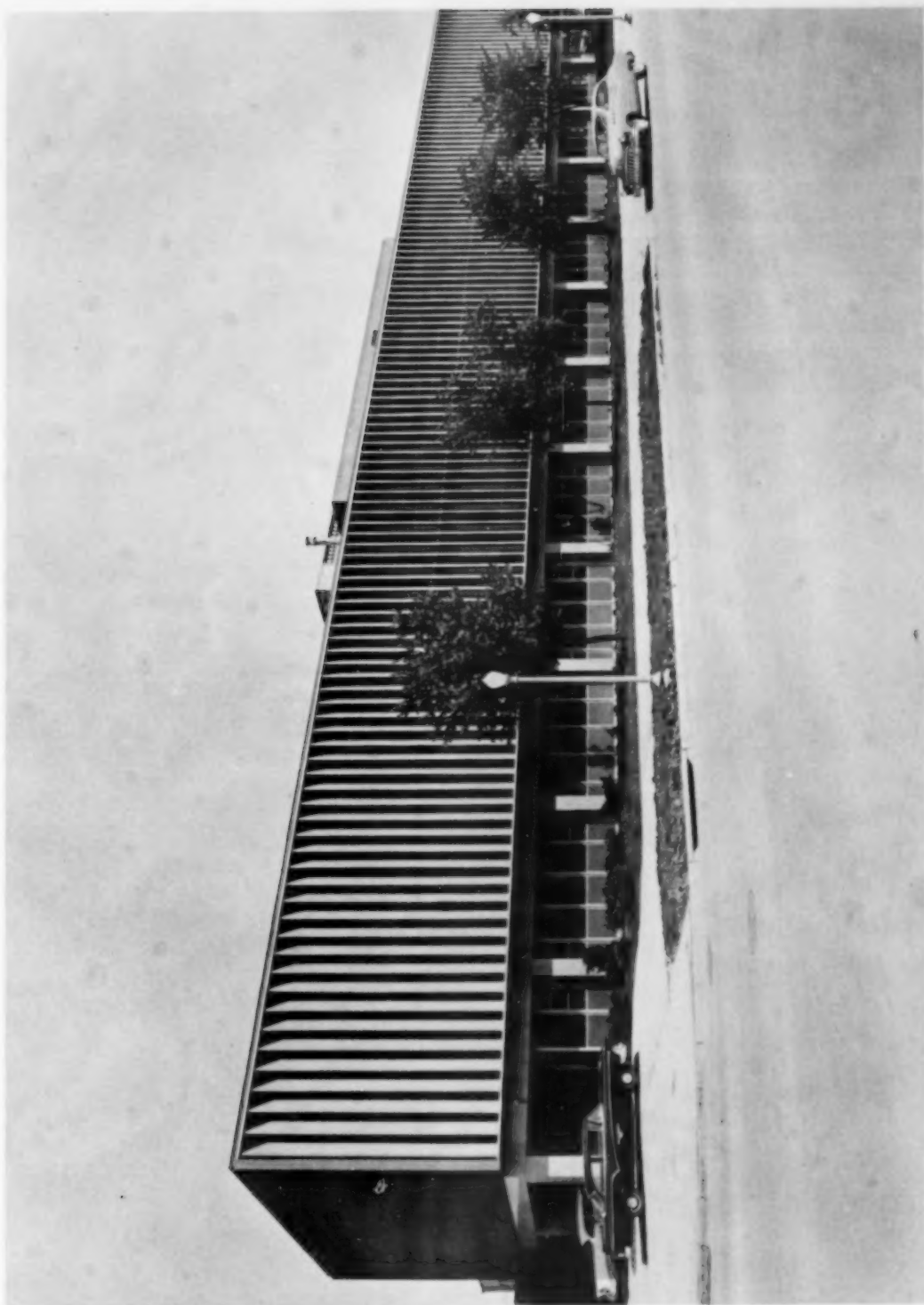


FIG. 1. LYMAN HALL, UNIVERSITY OF NEBRASKA

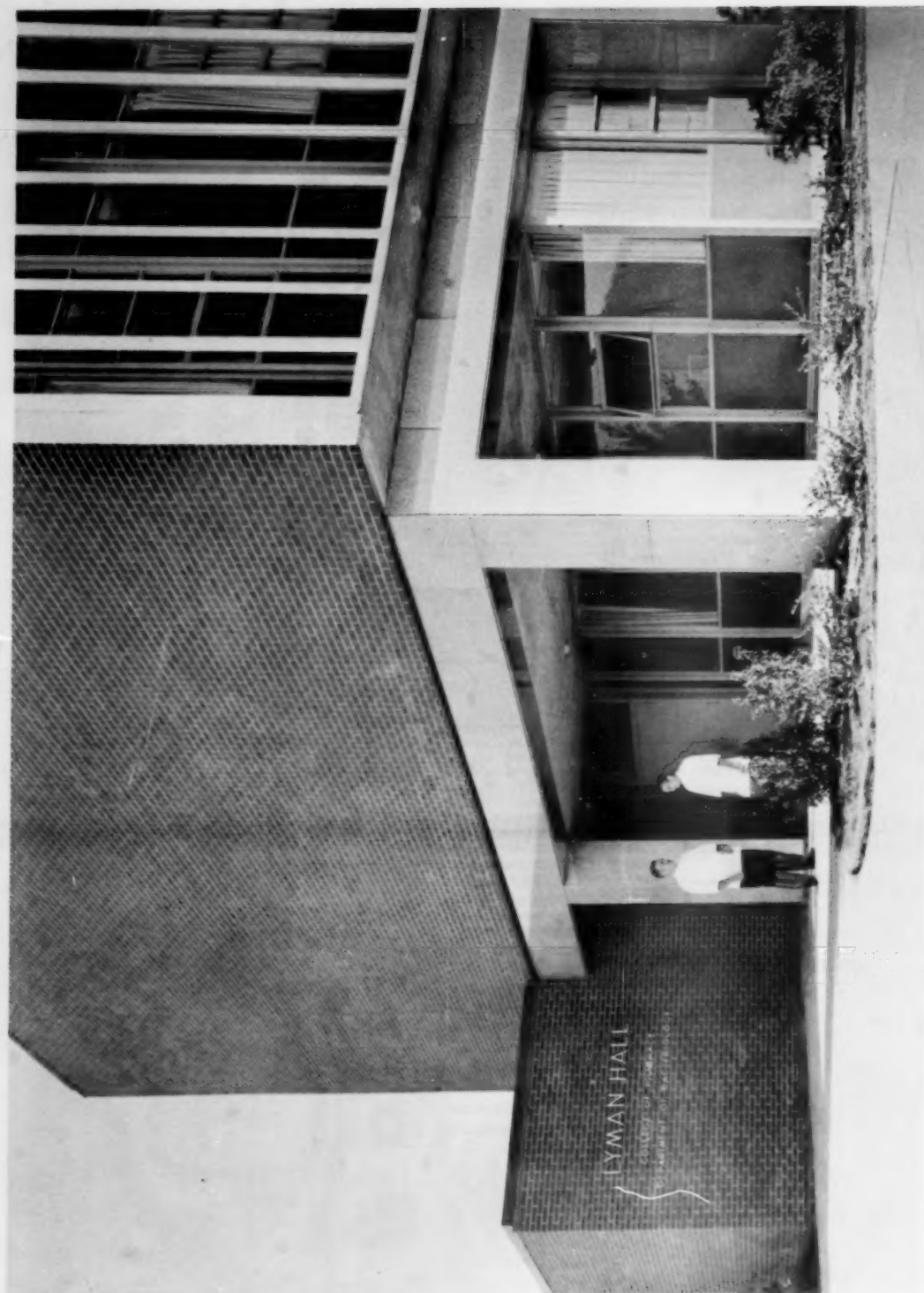


FIG. 2. LYMAN HALL, NORTH ENTRANCE, UNIVERSITY OF NEBRASKA

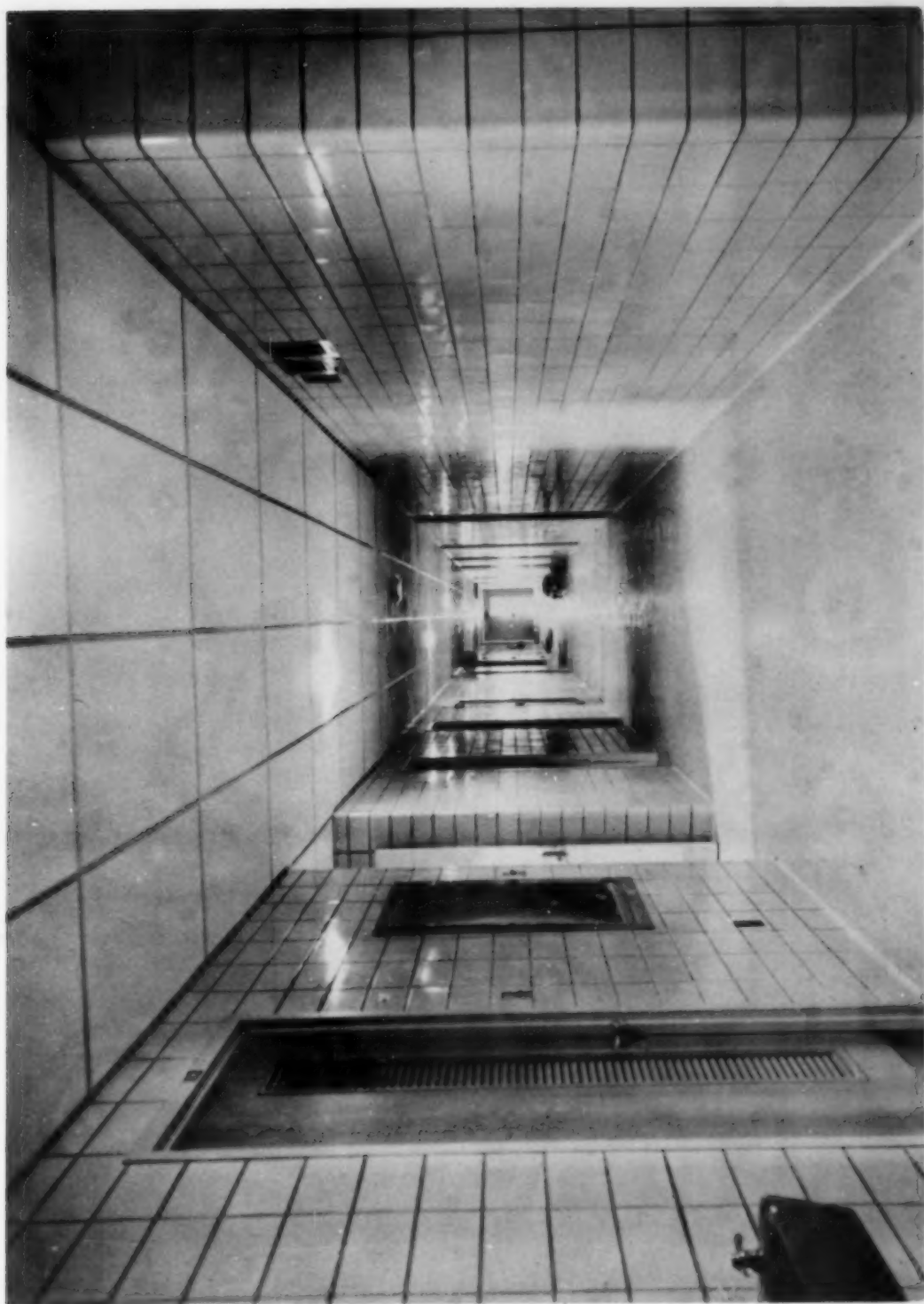


FIG. 3. CORRIDOR, FIRST FLOOR, LYMAN HALL, UNIVERSITY OF NEBRASKA



FIG. 4. PRESCRIPTION LABORATORY, LYMAN HALL, UNIVERSITY OF NEBRASKA

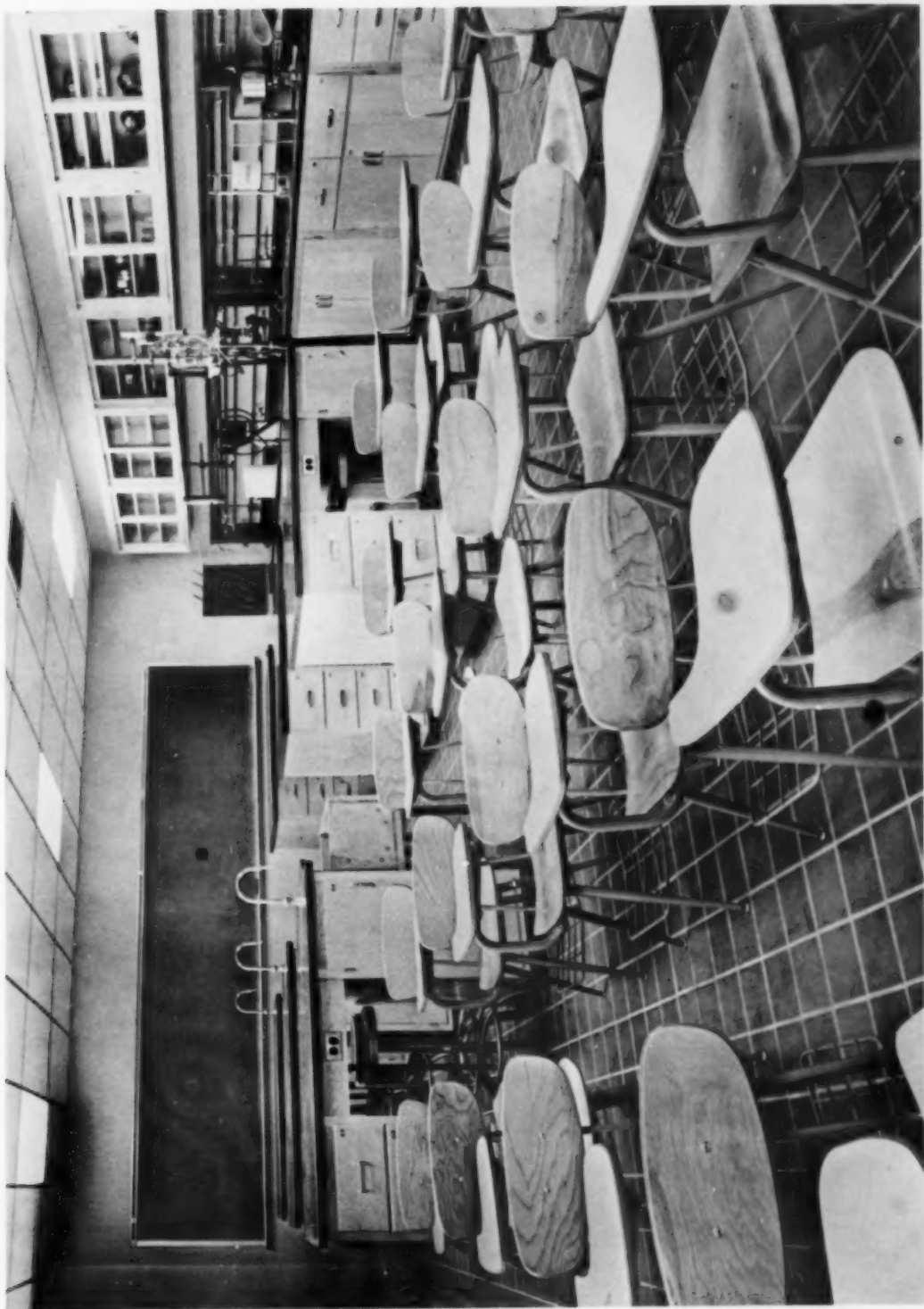


FIG. 5. PHARMACOLOGY LABORATORY, LYMAN HALL, UNIVERSITY OF NEBRASKA

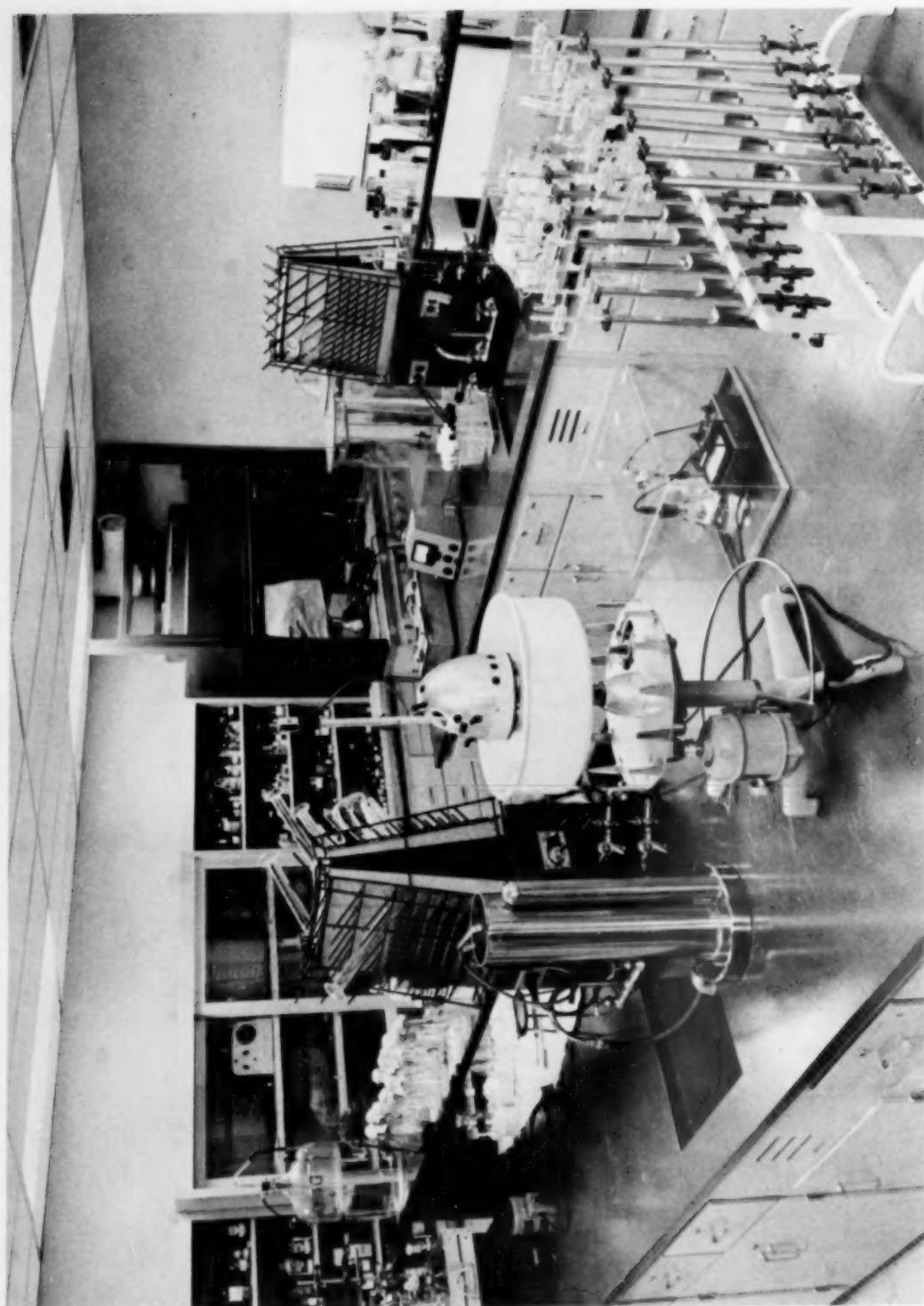


FIG. 6. PHARMACOGNOSY RESEARCH LABORATORY, LYMAN HALL, UNIVERSITY OF NEBRASKA

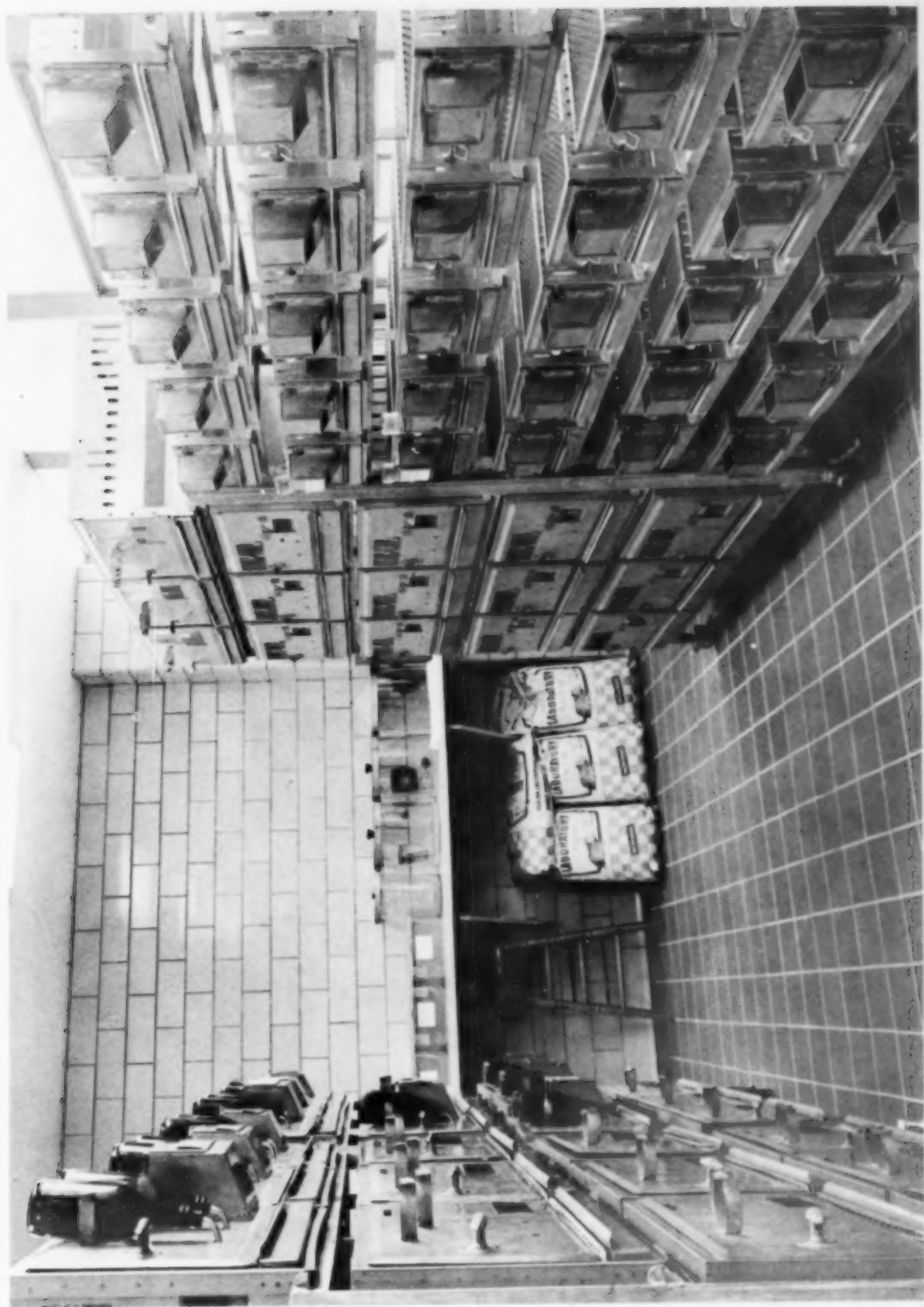


FIG. 7. ROOM FOR SMALL ANIMALS, LYMAN HALL, UNIVERSITY OF NEBRASKA

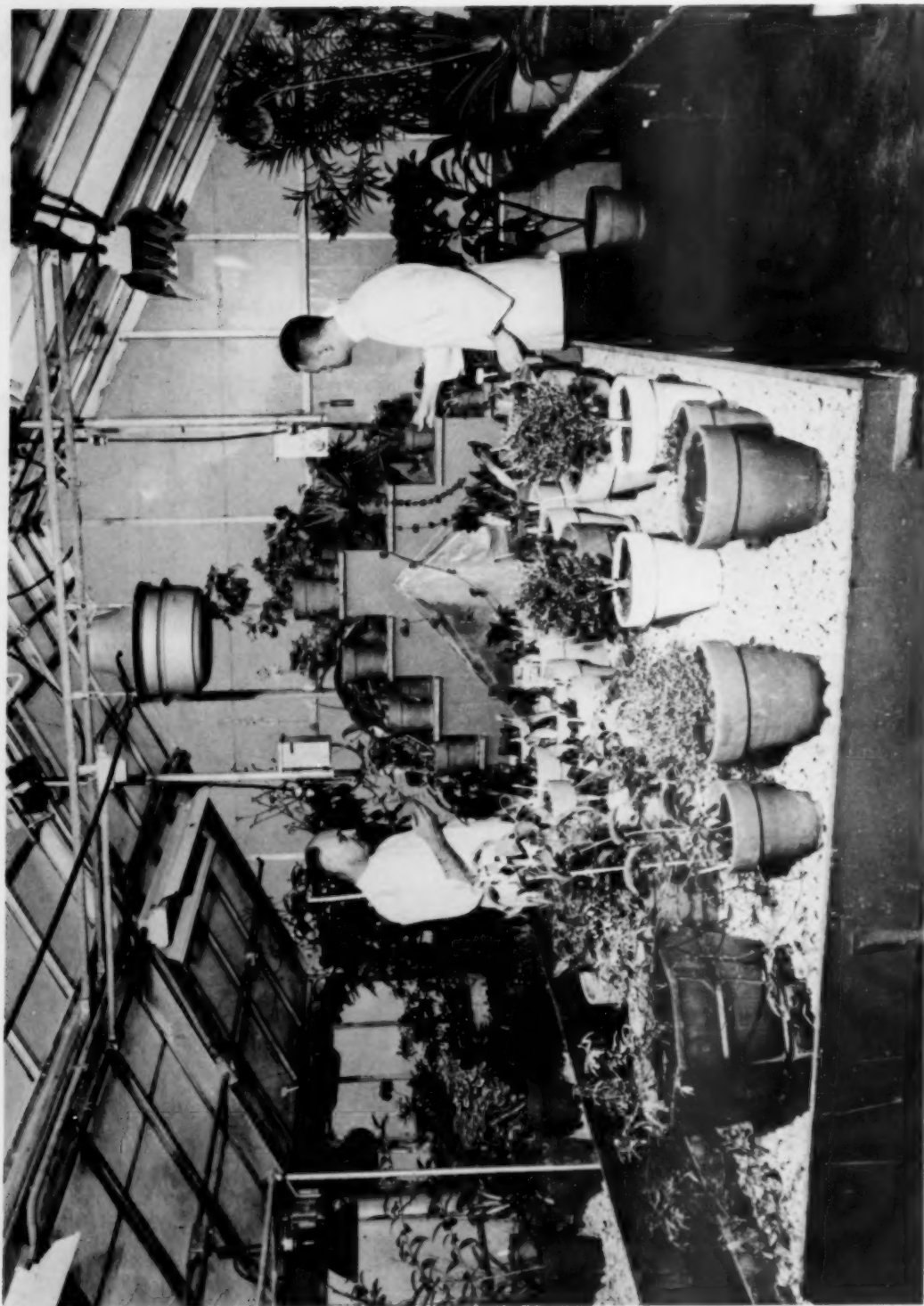
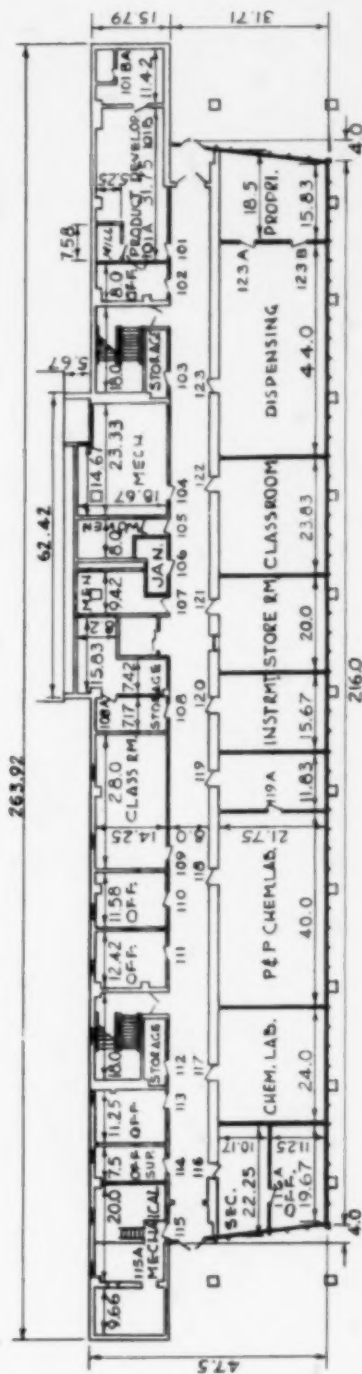


FIG. 8. GREENHOUSE, LYMAN HALL, UNIVERSITY OF NEBRASKA



FIRST FLOOR PLAN

SCALE 1"=30'

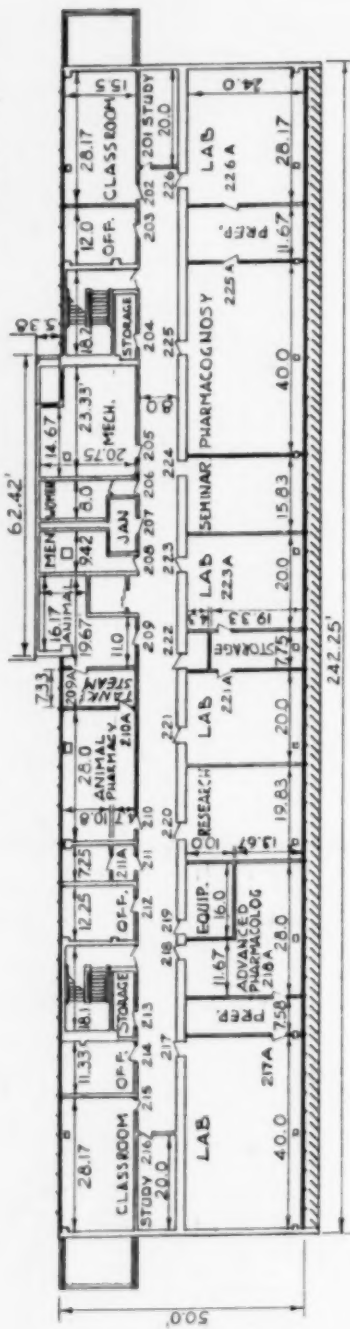
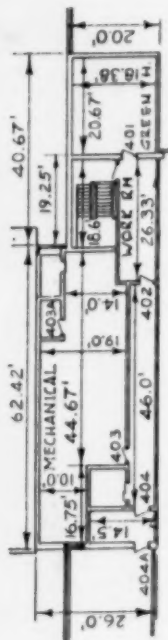


FIG. 9. FIRST FLOOR PLAN, LYMAN HALL, UNIVERSITY OF NEBRASKA



PENTHOUSE, MONITOR, & ROOF PLAN

SCALE 1"=30'



SECOND FLOOR PLAN

SCALE 1"=30'



FIG. 10. SECOND FLOOR AND PENTHOUSE PLANS, LYMAN HALL, UNIVERSITY OF NEBRASKA

118	Pharmacy and pharmaceuti-	122	Lecture room
	cal chemistry laboratory	123	Prescription laboratory
119	Preparation room		(The Pharmacy)
120	Physical measurements	123A&B	"Senior Study Room" and
	laboratory		prescription specialties
121	Laboratory supplies		
	(storeroom)		

Second Floor

201	Graduate student carrels	217	Pharmacology laboratory
202	Lecture room	217A	Preparation room
203	Faculty office	218	Advanced pharmacology
204	Storeroom		laboratory
205	Mechanical room	219	Pharmacology research
206	Women's rest room	220	Faculty research laboratory
207	Custodian's room	221	Pharmacy research
208	Men's rest room		laboratory
209	Animal quarters	221A	Preparation room
209A	Tank and steam room	222	Weighing room
210	Room for small animals	223	Pharmaceutical chemistry
211	Animal observation room		research laboratory
211A	Animal caretaker's room	224	Seminar room
212	Faculty office	225	Pharmacognosy laboratory
213	Supply room	226	Pharmacognosy research
214	Faculty office		laboratory
215	Lecture room	226A	Graduate student carrels
216	Pharmacology research		
	laboratory		

Penthouse (Fourth Floor)

401	Greenhouse	403A	Still room (distilled water
402	Headhouse		supply)
403	Mechanical room	404	Incinerator room

On the occasion of the dedication of Lyman Hall, one of the speakers, Dr. Louis C. Zopf, then President of the American Association of Colleges of Pharmacy, concluded his remarks with the following tribute to Dr. Rufus A. Lyman:

This hall will stand during the years when the Pharmaceutical progress which will be made will dwarf the innovations of the past five years. This is an inanimate structure, but it rightfully bears the name of the man who is revered in every College of Pharmacy in these United States.

From this campus, through Dr. Lyman's guidance and by his courage and fearlessness in his approach to problems of pharmaceutical education, has come an even greater monument than that which is symbolized by Lyman Hall. I refer, of course, to the *American Journal of Pharmaceutical Education* which was conceived, edited, and printed here for many years. This new structure with its modernized equipment and its electronic instruments will make it possible for the staff and the students of the future to participate in pharmaceutical pursuits in an era when the demands of science and the profession are being paced by the orbiting of man-made projected missiles. The perpetuation of a name is a symbol of esteem by man's colleagues and is a means of encouraging and challenging young people as leaders for the future. It symbolizes a man who was a sympathetic leader of young people; it symbolizes pharmacy; and, above all, it symbolizes a courage in pharmaceutical education. It symbolizes these things in a manner which the name alone will express to those who loved, knew, or worked with this man.

ARTICLES

A BIT OF RIBBON*

R. A. LYMAN, JR.

Whenever anyone considers the welfare of pharmacy, he is apt to dwell on its relationship to medicine, and how the two fields can be brought closer together. Some sober reflection should, however, convince anyone that this professional togetherness is apt to exist only as an hallucination conjured up by after-dinner speakers at pharmaceutical conventions. You and I, at least, will not live to see it come about, and neither will our children. Pharmacy has a future only if it will make the most of its separation from medicine. Any closer association that pharmacy strives to initiate with medicine is apt to be purchased at the price of the subservience of pharmacy. A body of practitioners can never be subservient to anything but its own ethical standards and at the same time constitute a profession. An essential attribute of a profession is pride. Pride and subservience are simply incompatible.

The success of medicine as a profession rests on much the same basis as does the success of the English as a race. An Englishman is said to be an ordinary fellow who knows that he is superior. That certainty alone confers a very genuine superiority, and it is the sort of conviction that pharmacy needs about its own worth.

So, rather than preaching peace and togetherness between pharmacy and medicine, I would encourage apartness and a spirit of competition, competition for knowledge and for understanding. To endorse some degree of friction between what should be synergistic forces is not as paradoxical as it may seem. Rather, it is in accord with principles which govern the living world. Every organism is constantly at war with its neighbor for the necessities of life, and that very contention over a period of many generations results in the improvement of both contending races. Conflict is not only the basis of survival, of evolution, and of progress among living things, but it is also characteristic of the processes that sustain life itself. The mechanisms which control respiration, circulation, digestion, and other vital phenomena are all based on the principle of opposed forces in conflict. Each of these functions is determined by the balance between exciting and inhibitory processes.

In spite of this biological evidence of the necessity of conflict and in spite of the fact that competition is supposed to be at the root of our economic and social systems, still there are those who deplore its presence everywhere. We are told that it has no place in the classroom. All schools, even colleges, are supposed to be happy places from which competition and rivalry have been banished to the gymnasium and the stadium. How successfully competition and accompanying enthusiasm have been eliminated from the one place and encouraged at the other is shown by the fact that, whereas there is no shortage of accomplished ball players, graduate schools (including medical schools) are almost desperate

* This article was written at the invitation of the Editor.

for qualified students. Anyone who has been either a serious student or teacher must realize that there is good reason for some conflict of interest between student and teacher. Whenever the relation is perfectly harmonious either there is no need for the teacher, or the teacher is not trying to accomplish anything. A teacher must be a questioner, a critic, and an example. I fail to see how he can serve in these three capacities without arousing dissatisfaction, competition, and occasionally even interest in the classroom. These very conditions, along with some confusion and frustration, constitute the atmosphere conducive to learning. Of course, if one has done no serious learning himself, he does not recognize the conditions necessary for its progress, nor does he understand the disturbing quality of knowledge once attained. Knowledge is neither calming nor pacifying. It is disquieting and forever drives its possessor to argument, to disagreement, and to change. It is mainly because we have not insisted that our teachers first be accomplished learners that education has fallen into its present predicament.

Even as some inevitable conflict of interest must exist between teacher and student so too must there always be some between physician and pharmacist. Let us turn it to good purpose in both cases. It can only be resolved by the one proving to the other his worthiness. Hope for pharmacy as a profession lies in making the pharmacist the best practical and theoretical pharmacologist (or medicinal chemist) possible, the man the physician can accept with respect rather than with condescension. No field of learning and practice has ever attained real professional stature unless it has within it subject matter that is really its own. Medicine has attained its position only because the knowledge of disease and the treatment of the sick is primarily the property of medicine and of medicine alone. This is not to say that others may not make use of this knowledge, but when they do so, they are obviously borrowing from what is the unique substance of medicine. No eclectic discipline, *i.e.*, no discipline composed essentially of borrowings, can ever emerge as a true profession. Nursing, for example, will never be a real profession because it has no body of knowledge peculiar to it. It will always be subservient to medicine, because from medicine it draws all, or nearly all, that it has to offer. This is not to say that nursing is not a worthy, necessary, and respectable vocation, for it is.

If pharmacy is to have a future as a profession, it must grasp more firmly a body of knowledge for its own. It must avoid subservience to medicine and stand independently as the profession concerned primarily with the knowledge of drugs. Many physicians may think that the subject of pharmacology already belongs to medicine. The only way to show them how wrong they are is to confront them with pharmacists that are better pharmacologists than are physicians. Any school of pharmacy that does not try to accomplish that end is not advancing the cause of pharmacy as a profession.

The education and the training of the pharmacist is no small undertaking. It will consume the allotted five or six years and more. Because of the magnitude of the task we are in no position to overlook any instructional assistance that is offered us. We must realize that the practice of pharmacy itself is an education and some things will be learned only from practice. In planning the collegiate part of the pharmacist's education, we must concentrate on those things which, in all probability, can be learned only in a college. Whatever can be learned elsewhere, should be learned elsewhere. Whenever we let practical courses in

merchandising, advertising, or on other phases of drugstore management intrude upon the pharmaceutical curriculum, we are cheating the students out of something that can be learned only in a college, and moreover we are affronting the retail pharmacists who are needed in teaching, and who deserve a place there. Practitioners of the professions have always jealously defended their teaching privileges. Anyone who tries to deny them the right of training the next generation in the applied phases of their art is twisting the tail of a lion—at least such is the case in any real profession, and so it should be in pharmacy. Let the academic man in his laboratory and classroom teach what he is best prepared to teach. Let the master pharmacist teach in his place of business what can best be learned there. Let neither try to usurp the function of the other, for each in his place is indispensable.

The fact that he is also a merchant will always impair the professional standing of the pharmacist, just as his being an employee of the patient is a hindrance to the physician. There is nothing inherently wrong in being either a merchant or an employee. It is only that the ethics, motives, and aspirations that are acceptable in these capacities are different from, and to a certain extent incompatible with, those of a profession. Professional status presumes an absolute freedom of action on the part of the practitioner, a freedom unaffected by even the remote possibility of a profit motive. When the physician and the pharmacist are perfectly free to act in accord with their best judgment and when there is no suspicion that expediency can affect their decisions, then and only then do both attain the ultimate in professional stature. The problem of wearing two hats is by no means an insurmountable one. The physician attempts to solve it by emphasizing his professional knowledge and competence, and by deprecating or ignoring his status as an employee. So successfully has he accomplished this end that even the patient is apt to regard him more as a master than as a servant. The pharmacist can do likewise. He can be known for his knowledge of drugs and his soundness of judgment rather than for his understanding of trade, but only if he is willing to pay the price, a price exacted not only in life-long study, but in a willingness to forego an immediate profit for an ethical principle. The man who aspires to be a pharmacist and who is willing to pay this price needs more of the training of a scholar, the kind of training that is to be had only in schools. He also needs contact with teachers and with pharmacists who are themselves men of such a stamp. Besides, he needs something else that no one can give him, something that he must obtain, from where I do not know. It is the way that he must always think of himself, as one similar to others, but in some way a little different, the kind of difference that would permit him, if such were the custom, to wear a bit of ribbon in a buttonhole.

It has been said that a researcher is a person who does not know what he is looking for, but he is not happy until he finds it.

C. A. Elvehjem, *Am. J. Pharm. Ed.*, 12, 256 (1948)

THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES*

LEE POWERS

On June 2, 1876, representatives of twenty-two United States medical colleges met in Philadelphia "to consider all matters relating to reform in medical college work" and to form a provisional Association of American Medical Colleges. (1) (2) ** This was the beginning of the present Association, which is composed of all American medical colleges—both those in the continental United States and Canada—plus the University of Puerto Rico, the American University of Beirut, Lebanon, and the University of the Philippines. The Association of American Medical Colleges is dedicated to the study, evaluation, and solution of the many and varied problems of medical education as they may affect the public welfare.

The development of American medical education and of the Association of American Medical Colleges parallels the socio-economic development of the United States itself. In fact, every phase of American medical education has its explanation in our socio-economic history.

The apprentice training in medicine which developed during the early colonial period had its counterpart in the same practice in other crafts and guilds.

The proprietary medical school of the nineteenth century was a decidedly American innovation that reflected the laissez-faire philosophy peculiar to the time. The teachers in most of these schools were not unlike their counterparts in the business world, exploiting the students and the public without regard for the consequences as far as standards of practice were concerned. Then, with the turn of the century, coincident with the demand for reform in the socio-economic and political fields, the American public demanded similar reforms in medical education and practice. Thus, at the same time that American socio-economic development was reaching the stage of more responsible planning, medical education began to gain a parallel sense of direction. As American enterprise began to stress efficiency and to develop ethical standards of conduct, standards of medical education and practice started to rise.

By 1903, the Association of American Medical Colleges had begun to make detailed studies and reports on each member school. A year later, the Council on Medical Education of the American Medical Association was established. It began to inspect schools in 1906.

Probably the most significant step towards improvement was taken in 1908, when the American Medical Association and the Association of American Medical Colleges requested the Carnegie Foundation for the Advancement of Teaching to finance a study of American medical education. Dr. Abraham Flexner was appointed to this task.

At the time of Dr. Flexner's survey, there were nearly as many medical schools in the United States as existed in the remainder of the civilized world—but most of these institutions had very low standards and were highly commercial in character.

* Presented to the AACP Convention, Cincinnati, Ohio, 1959.

** The historical material used in this paper was adapted from Shryock's book *Medical Research*. (See references.)

The Flexner report was published in 1910. Its impact on American medicine was very significant. Proprietary medical schools began to disappear in favor of the university-controlled medical school-hospital combination. Admissions and educational standards were raised accordingly. Along with this reform, the internship was established, and formal hospital training for specialty practice began to make its appearance. As a general pattern, medical schools began to add full-time faculties, to develop good teaching hospitals and clinics, and to incorporate medical research into their responsibilities. The resulting rapid accumulation of medical knowledge led to the improvement of teaching methods and to the gradual lengthening and stiffening of the curriculum.

Prior to 1900, American investigators, with a few notable exceptions, contributed relatively little to medical knowledge or systems of thought. But following the turn of the century, there began to evolve in the United States a system of medical research, education, and practice which eventually was to eclipse other medical activity throughout the world.

In spite of its startling attainments during the past half-century, American medical education has not attempted, nor been allowed, to rest on its laurels. Rather, the demand of the American public for even better health facilities and care, coupled with the public's increasing ability to pay for medical services, has forced the activities of the medical schools, both individually and collectively, to expand rapidly over the years. The collective activity of American medical schools is channeled through their central organization, the Association of American Medical Colleges.

So much for the past—now a brief discussion of the Association's present objectives, activities, and programs.

The objectives of the Association are now stated as "the improvement and advancement of medical education (a) by developing increasingly effective means of selecting the most able students for the study of medicine, (b) by encouraging experimentation in curriculum development and medical teaching methods, (c) by supporting experimentation, studies, and programs aimed at improving the ability of students to learn and teachers to teach, (d) by supporting efforts to improve the hospital internship and residency as educational experiences, (e) by supporting efforts to improve and broaden the influence of continuing medical education, (f) by developing the knowledge and leadership necessary to provide for the long-range progress and stability of medical education, and (g) by creating and maintaining effective avenues of communication among medical educators and between medical educators and the American public." (3)

One of the activities necessary to accomplish these objectives has been the establishment and maintenance of minimal standards for the medical schools. This responsibility is shared with the Council on Medical Education and Hospitals of the American Medical Association through what is known as the Liaison Committee on Medical Education.

The Committee visits each school at least once during every ten-year period. This program has enabled the visiting teams to examine the weaknesses of each school and to indicate to that school's administration the possible avenues for improving the situation. It also provides an opportunity for schools individually and collectively to study themselves in terms of program, facilities, faculty, and students and to seek the necessary resources and methodology for continuous improvement. The standards that are used in judging schools are broad in

nature and offer an umbrella under which each school can use its own initiative in planning a successful curriculum. No attempt is made to dictate the number of hours required in anatomy or any other subject, nor to legislate the exactness of equipment and facilities necessary to maintain an acceptable medical school. Rather, the Liaison Committee makes its recommendations in broad terms, often indicating the direction in which American medical education could most profitably go and, through this, encourages experimentation by each school in better ways and methods of attaining this end.

In recent months, the Association's research has expanded into the operational area of medical education where a five-year program of studies, financed by the Kellogg Foundation, has been designed and established.

This program has been based on careful analysis and consideration by the Association of American Medical Colleges, which in 1956 resulted in the adoption of a statement to the effect that if the United States were to have enough physicians to meet future needs, it should increase its output of physicians by increasing the number of its medical schools.

One year later the Association adopted another statement which pointed out that an almost immediate, though partial, increase in the physician population could be obtained by encouraging universities with strong leadership and necessary resources to establish new programs offering the first two years of the medical curriculum. Students completing these two-year programs would be accepted to fill the seven- to eight-hundred vacancies existing each year in the junior and senior classes of the four-year schools. In 1958, still another year later, the House of Delegates of the American Medical Association adopted a recommendation of its Council on Medical Education and Hospitals which places the American Medical Association and the Association of American Medical Colleges in agreement with the aforementioned statements.

These events have implied that the Association of American Medical Colleges must assume a role of leadership which basically would involve detailed study of the four essential components of medical education—faculties, facilities, financing, and students—and the assemblance of the information gained therefrom into intelligent, long-range plans and proposals.

With the nation on the threshold of strengthening and expanding its system of medical education, many questions are being asked by many sources—voluntary and governmental health and welfare agencies, state legislatures, the national Congress, business and professional groups, and the universities and medical schools themselves. It is imperative that medical educators attain a position from which they can both plan their part in encouraging any momentum that may result and keep any planning and action that affect our schools of medicine within reasonable balance and bounds—balance and bounds as to education versus research and medical service, and balance and bounds as to education for quality versus education for quantity. While we have many of the answers, some of them are either non-existent or are buried in the literature. Much important information lies in the files of the Association of American Medical Colleges, the American Medical Association, or other agencies in the form of raw data awaiting organization and analysis. It is, therefore, basic to the accomplishment of its objectives that the Association do what is needed to establish itself as an information center on matters pertaining to medical education. In pursuing its course, the Association may have to align itself with or occasionally

oppose such powerful forces as the federal government or other organized interests in our society. It finds itself in a position of great responsibility—a position that is charged with opportunity, and also with difficulty.

In recent years, the Association has worked with the Educational Testing Service of Princeton, New Jersey, in developing a scholastic aptitude test which is either recommended or required by all U.S. medical schools prior to acceptance in the freshman year. Designed to assist admissions officers in the evaluation of the intellectual characteristics of medical school applicants, the test is one method of providing information on the student's capacity to learn graduate-level materials, his understanding of basic scientific principles, and his breadth of acquaintance with present-day society. The test is known as the Medical College Aptitude Test.

Though the test is chiefly used by admissions officers of individual schools, along with a student's undergraduate record and a personal interview, to evaluate him for acceptance, it also provides an excellent program of study over the years of a student's ability and knowledge as compared with other students in his own class, both locally and nationally, as well as with students of other years.

Recognizing the need for re-evaluation of the techniques and objectives of medical education, the Association of American Medical Colleges in 1953 established a series of teaching institutes which have been held annually since that time.

The first three institutes examined the role, content, and methods of teaching basic medical sciences. The fourth and fifth institutes focused attention on the students, one dealing with the methods and techniques of selection of applicants to medical schools and the other with the ecology of the medical student. Last year, the sixth teaching institute considered the phenomenon of clinical teaching, its objectives, the settings in which it takes place, and the inter-relationships among students, teachers and patients. The 1959 teaching institute again will concentrate on the area of clinical teaching—dealing particularly with the content of clinical teaching programs, the inter-dependency of the basic medical sciences and the clinical specialties, postgraduate medical education, and the crucial problem of welding together the art and science of patient care and responsibility.

Institute attendance is by invitation only and limited to approximately 125. Participants in these working conferences include one representative of each member institution of the Association as well as special guests from disciplines related either directly or indirectly to medicine.

As with other associations, we hold an annual meeting. This is a three-day conference for medical educators and interested representatives from other disciplines. The program consists of the presentation and discussion of selected papers by outstanding national and international speakers and the presentation of awards for excellence in the field of medical education. Along with these informational aspects of the program, the annual business meeting of the Association is held as well as the many and varied committee meetings.

Each month, the Association publishes the *Journal of Medical Education*, the only journal in the world devoted exclusively to this subject. Included in each issue are educational and scientific articles, news briefs from educational institutions and related groups, editorials, book reviews, brief summaries or "Data-grams" of current research, studies and reference material, and a forum through which authorities discuss, in print, many topics important to medical education

and higher education itself. Circulation of the *Journal* is international in scope with current subscriptions representing approximately sixty foreign countries.

Besides the *Journal of Medical Education*, the Association publishes several other books and brochures on various aspects of medical education, including a handbook, *Admission Requirements of American Medical Colleges*, for use by applicants. Reports of the teaching institute, the annual directory of the Association, a periodic news letter, *The Medical Mentor*, and, occasionally, special publications and reports of particular importance and interest to medical education are also published.

An increase in the availability and importance of audio-visual aids to education in recent years has warranted the establishment of an Audio-Visual Institute within the Association to provide a revolving film library on medical subjects for use by the schools, to provide an information source for films and other audio-visual aids, and to produce and distribute curriculum-integrated medical teaching films to medical schools and related groups.

COOPERATIVE PROGRAMS WITH OTHER AGENCIES

1. In addition to the school survey program previously mentioned, the Liaison Committee of the American Medical Association and the Association of American Medical Colleges develops and distributes to each medical school an annual questionnaire concerning the operational programs of the medical schools. This provides a medium through which practitioners and educators have been able, cooperatively, to labor on the many problems facing medical education, research, and service. The results of this survey are reported each fall in the Education Number of the *Journal of the American Medical Association*.

2. The National Intern Matching Program was organized eight years ago as a separate corporation to serve as a clearing house for helping the graduating medical student obtain an internship at the hospital of his choice as well as to help the hospital obtain a graduate of its choice. The National Intern Matching Program is serviced by the Association of American Medical Colleges for the National Intern Matching Program Corporation—whose member organizations include the American Medical Association, the American Catholic and Protestant Hospital Associations, the Student American Medical Association, and the Association of American Medical Colleges. In the eight years since its inception, the Matching Program has attained such success that approximately 98 per cent of approved hospitals and a similar proportion of graduating medical students are expected to be included in the program by next year.

3. The Educational Council for Foreign Medical Graduates, co-sponsored by the American Hospital Association, the American Medical Association, the Federation of State Licensing Boards of the United States, and the Association of American Medical Colleges was established in 1957 as a means of evaluating the education of foreign medical graduates wishing to take advanced training. Two world-wide examinations are provided each year by the Council to ascertain whether or not those foreign doctors wishing to come to the United States have reached a level of educational attainment comparable to that of students in American medical schools at the time of graduation. Results of the examination are provided to hospitals, state licensing boards, and specialty boards, which have been designated by the foreign medical graduate, and are used by those groups in evaluating the individual.

Though the Association of American Medical Colleges conducts many other programs in areas related either directly or indirectly to medical education and research, most of these are cooperative projects with the myriad of private, governmental, and philanthropic organizations actively interested in this field. These groups include various branches of the federal government, the national voluntary health organizations, the pharmaceutical industry, medical specialty groups, para-medical groups, the National Fund for Medical Education, many national educational associations, private foundations, and the various divisions of the American Medical Association and the American Hospital Association.

CONSIDERATIONS FOR THE FUTURE

So far, this paper has concerned itself with the past and present of the Association of American Medical Colleges. Now for a look ahead.

If a single word were chosen to describe the problems facing medical education and research of the future, in fact, facing all of higher education, it would be "financing." Most of the problems referred to—or those yet to be mentioned—could at least partially be solved through the existence of adequate funds.

Once the present studies have revealed an adequate picture of medical education's financial needs, it should then be possible to identify all of the sources of income and analyze each as to its potential support on a long-range basis. It is hoped that through this program, a reasonable balance can be established among federal, state, and private support. If this should be impossible—and the federal government should bloom as the majority stockholder of the future—then medical educators *must* develop plans to insure a *minimum* of federal control.

Programs must be developed to encourage more numerous applications from students of higher quality to medical schools and to schools in the biological sciences. The existing vacancies in budgeted faculty positions, estimated faculty needs of the future, plus a realization that we are getting fewer high-quality applicants for medical school are factors that indicate the need for such programs.

Programs should be developed which will provide more adequate scholarship, fellowship, and other financial aid to undergraduate, graduate, and post-graduate students in medicine and the biological sciences. Needs in this area are extensive as revealed by some of the current studies—student indebtedness on graduation from medical school, the difficulties of interns and residents in supporting their families in this period of inflation, and the estimated need per school for additional scholarship and loan funds, to mention but a few.

Considerable work must be done in planning and coordinating adequate post-graduate programs in medicine which will meet the demands of the near future. At the present time, much of this is being done by industry and various other groups with little assistance from the medical educators themselves.

Population trends and socio-economic patterns of this nation must constantly be studied in combination with the present knowledge of disease and the new developments in research. Medical curricula will have to be adjusted accordingly. Relationships between medical schools and teaching hospitals—whether these institutions are owned by or merely affiliated with the universities—need continual review in an effort to solve the inherent problems of sharing of costs, staffing, administration, and many others. Medical care plans have their impact, too. The indigent teaching patient, long a tradition in medical education in this country, may become a vanishing race replaced in teaching programs by patients well covered by hospital insurance.

Finally, greater assistance must be provided in the future to many foreign countries, institutions, and individuals who are increasingly seeking help from American medical educators.

This, then, is the Association of American Medical Colleges, past, present, and future. It is hoped that this bird's eye view of some of AAMC's projects, problems, and proposals will be of benefit as you work with your own organization in behalf of the schools of pharmacy.

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Those who select students in large measure determine the future character of the profession itself. It is important, therefore, that responsible members of the professions come into contact with these young people at the earliest possible moment in order not only to pick the most promising, but also to influence the formation of the attitudes and habits of those selected.

Earl J. McGrath, *Am. J. Pharm. Ed.*, 13, 136 (1949)

PHARMACY RECRUITMENT OF THE YOUNG SCIENTIST

RICHARD F. CHILDS* AND VIRGINIA H. CHILDS

There is growing competition among the science fields for the more able science-oriented student. (1) For example, there has been a drop in the percentage of medical school "A" student applicants from 40 per cent in 1950-1951 to 16 per cent in 1958-1959. (2) To avoid a similar situation in pharmacy, the profession must become more aware of its public responsibility to recruit the more able science student. Pharmacy is one of the few sciences that maintains an intimate public contact, which in many ways increases its recruitment task. Pharmacy students are almost required to possess a dual aptitude, that of the "introverted" scientist plus that of the "extroverted" salesman. (3) An ideal recruitment program should extend from the elementary school teachers and children to the practicing pharmacist. Shallow-rooted programs based upon the High School Senior Career Day approach, which carries the odor of a fraternity rush promotion, will eventually lead to disappointment.

A summary of available studies indicating why and when young people first become interested in science reveals the following facts:

1. Dominant science interests develop at an early age. (4)
 - A. Science Service cataloging of National Science Fair finalists revealed that 79 per cent of the 700 finalists first became interested in science between the ages of eight and fourteen years. (5)
 - B. Adult scientists help stimulate interest as early as eight years. (6)
 - C. Interest appears by the age of ten, and this interest is predominantly in the physical sciences. (3)
2. Adults encourage early interest in science.
 - A. Parents of forty outstanding Science Talent Search winners surveyed by Science Service described factors which motivated their children's success in science. (6)
 1. About one half indicated that it was important to foster habits of intellectual curiosity by providing science books, basic equipment, and family trips to museums, national parks, and science laboratories.
 2. The second most prominent factor was contact with sympathetic and understanding adult scientists.
 3. The third most-mentioned influence (57 per cent of the questionnaires mentioned it) was the presence of a scientist in their family background.
 4. The teacher brought about scientific activity during the age range of five to seventeen years, with the peak influence at thirteen to sixteen.
 - B. The "typical" scientist's career choice was motivated by his father or teacher. (3)

* Southern Arizona Regional Science Fair Director, 1958 and 1959.

"What kind of people choose scientific careers? What are their reasons?" (3) Long before the Russian sputnik, a group of Columbia University psychologists set about to answer these critical questions. They surveyed the literature written by behavioral scientists about the natural scientists (physicists, chemists, biologists, engineers, etc.), and from this information painted a picture of the "typical" natural scientist. Among their conclusions were:

1. The "average" natural scientist is an only child or eldest son, and is usually from the North Central or Western states.
2. Intellectually he ranks in the upper 10 per cent of his college freshman class, he is enthusiastic, original, exceptionally honest, and possesses powers of imagination and observation.
3. His personality traits are not as outstanding. "The 'typical' scientist typically is 'introverted,' shows asocial tendencies, has strong leadership drives—and he is 'somewhat poorly adjusted.'"

In 1954, Bull personally interviewed 100 science-interested students at the high school level to determine, if possible, the conditioning experiences that lead to unusual interest in science. (4) The results of his study reveal in part the following:

1. The majority of pupils exhibiting science interests are superior in scholastic ability.
2. Nearly all of these 100 pupils possess acceptable social poise and would not be classified as unusual in social behavior.
3. Approximately three fourths of these pupils have a preference for interests and hobbies involving the physical sciences.
4. This group exhibits a keen curiosity about scientific apparatus, they read scientific literature, and they are usually encouraged by others to continue their bent of interest.

As a result of his study, Bull makes the following recommendations:

1. Since the development of science interest begins before or during the junior high school level, elementary schools may foster science interest by providing science activities and reading material.
2. Science teachers should recognize and encourage science-interested students.
3. Knowledge of vocational opportunities in science should be made available to teachers and pupils at the elementary level.

It is clear from the studies cited that certain similarities were found by all the authors: (a) an early interest in science, (b) the influence of parents, teachers, and scientists, and (c) a greater interest in physical sciences than in the biological sciences. The last point should be of particular concern to the pharmacy profession.

How have other scientific groups attempted to win over and stimulate young scientists? Industrial firms have recently been successful in sharing their stimulating science experiences with young people and their teachers by bringing their scientifically trained employees to the schools. (7) Examples of this procedure have been the traveling exhibits from Oak Ridge Institute for Nuclear Studies, the Texaco Research Center Program, and the Goodyear Atomic Corporation. The Goodyear employees' approach was to whet the scientific appetite of the youngsters by presenting twenty to thirty scientific experiments in an hour's time. Among the demonstrations presented were the Wilson cloud chamber, a phenolph-

thalein ammonia fountain, and the bubble trick (a volunteer blows and counts the bubbles entering a round bottom flask. At the end of the experiment the student gets a face full of water that amply demonstrates how aerosol containers function). Note that these demonstrations are primarily based on the physical sciences. This type of approach probably is important in arousing temporary scientific interest, but the contact is too brief to have lasting value. (8) Assisting the teacher and student directly at the local level is apt to be more rewarding, however, it also requires continued effort.

Tippo recently re-emphasized the way college and university scientists have in the past decades turned their backs on high school science and the high school teacher. (9) Preoccupied with research, the scientists have neglected the secondary school teacher's preparation, welfare, and courses he teaches. Teachers' colleges and education departments have moved in to fill the vacuum until now they have almost complete control of science teacher education and of secondary science course content. In order partially to remedy this situation, a Committee on Education and Professional Recruitment of the American Institute of Biological Sciences was formed three years ago. Among its several functions was the production of a secondary school biology film series.

An excellent program established by the National Science Foundation has been the many different kinds of Science Teacher Institutes. These institutes provide the teacher with the financial means to improve his scientific knowledge by attending special classes at universities and colleges, the various atomic laboratories, or working in related industries. It is a practical approach to the problem of "keeping up" in the sciences, and provides both ideas and equipment for future classroom use.

Many organizations are assisting in the program of the Science Clubs of America. (10) There are currently about 25,000 science clubs in the USA and in foreign countries. In the fall of 1959 these clubs will boast a membership of 500,000 boys and girls. Participants in local fairs affiliated with the National Science Fair may win trips to the 1960 national fair at Indianapolis, Indiana. Other awards that are available include Science Achievement Awards, the American Medical Association Award Citation, the Wescon awards, and others.

The AMA Award program was devised to encourage youth to excel in early science achievement in biology. Last year's two top AMA winners at the National Science Fair received all-expense paid trips to the AMA convention at Atlantic City where they exhibited their projects before 33,000 physicians and guests. Martin Murphy, one of these winners (the other was a girl), praised the value of Science Clubs and the National Science Fair because these efforts have stimulated more youthful interest; in fact, "Fewer people consider us freaks." (11) Both winners have been offered summer jobs at pharmaceutical companies. The AMA House of Delegates urged every local medical society to assist programs designed to encourage the nation's youth to take serious interest in science as a career. In fact, Dr. Louis M. Orr, President of the American Medical Association, states, "I believe that each of us should take a personal interest in one or more potential candidates for the medical profession. We might counsel these students much as a member of the clergy does for a young person who is suited for the ministry." (2)

Local pharmacists can assist the program of the Science Clubs of America. The grand prize award concept is very praiseworthy, but the giving of many small tokens of encouragement can be of tremendous importance at the local

level. (12) Local fairs are sponsored by school science clubs and the science teachers; since the money to run the fair often comes out of the pockets of the teachers or the limited treasury of the club, the number of awards are often limited. (8) The Tucson, Arizona, Pharmaceutical Association has given pharmacy awards at the Regional Science Fair for several years. The two photographic-type troemner balances given each year have helped to encourage contestants to prepare projects of pharmaceutical interest. In fact, due to the help of others there are enough pharmacy contestants to rate a special judging category in this field. In Arizona the authors have found that many science fair contestants are very much in need of new project ideas. Many of the following suggestions have been, or will be, entered in the Southern Arizona Regional Science Fair in the pharmacy category:

1. A tablet disintegrator
2. An animal jiggle cage
3. A light beam-type animal activity cage
4. Chromatographs of plant drug products
5. Seeds with fertilizer compressed around them using a tablet machine
6. A tiny radio transmitter for a mouse used to record changes in body temperature when drugs are given
7. A special harness and transmitter to record the electrocardiograph of a freely moving dog. (8)

To assist Tucson students in obtaining special references needed in their science work, arrangements have been made which allow qualified and responsible young students to use the University of Arizona library facilities. (8)

A university-sponsored Regional Science Fair can be a real asset to the university science departments by providing an opportunity for the fair contestants to examine the facilities and research programs of the college. When a member of the pharmacy faculty is on the science fair committee he can see to it that during the judging period the contestants will visit the pharmacy open house. The Southern Arizona Regional Fair sponsored a program entitled, "Things to See and Do on Campus," during the 1959 Southern Arizona Regional Science Fair, Future Farmers of America Annual Field Day, and the Third Annual High School Art Festival. The College of Pharmacy open house consists primarily of scheduling undergraduate laboratories during the science fair judging period. Each pharmacy student describes to the contestant what he is doing and why. The pharmacy students "reach" the contestants much better than the professors. This type of open house has often resulted in having five or six contestants spend the entire tour period in the pharmacy laboratories.

"It is easily seen that the general dearth of biological project information and equipment leads these young people to the physical sciences." (13) Other professional organizations, such as the American Dental Association (14) and the U.S. Department of Health, Education and Welfare (15) provide booklets listing science projects, classroom experiments, and other information relative to their particular fields. Pharmacy could compile booklets for the elementary, junior high, and high school levels that would include applicable pharmacy experiments. A junior high science teacher could, for example, introduce the subject of solubility by demonstrating differences between the disintegration of a sodium chloride tablet and an aspirin tablet. (16)

Guidance materials should be provided the *science teachers*, since they are the ones most closely in contact with the future scientists. In Tucson, a local member of the American Optometric Association personally delivered vocational information to the high school biology department at the request of one of the authors. This same material was subsequently used by a university student unable to obtain the needed information from his college instructors! Excellent material is available about pharmacy as a career for high schools, but not for the lower grades. (8)

Individuals at the University of Arizona College of Pharmacy have noted that the procurement of apparatus, chemicals, and drugs by science fair contestants in biology and pharmacy is much more difficult than the obtaining of electrical or mechanical apparatus for the physical science contestants. For example, one student working on a physics project has received several gifts of materials from local companies which are not even directly concerned with scientific apparatus. (8) The College of Pharmacy does its best to assist local contestants and their teachers, but on a broader basis the local pharmacist could offer greater assistance. If the A.Ph.A. established a national clearinghouse for the distribution of chemicals, drugs, and equipment to qualified Science Club sponsors, and selected a pharmacy or two in each science club area that would take the time to order needed materials, such items would be more readily available to the science student. The national clearinghouse, working with a poison control center, could accompany shipments of drugs and chemicals with suitable poison caution information. Qualified pharmacists, skilled in handling drugs and aware of their toxicity, could explain verbally any questions raised by the club sponsor at the time of purchase.

Another way in which pharmacy could encourage young scientists and their teachers would be to follow the example of some organizations which invite teachers and students to their conventions, publish worthy scientific investigations done by students, and employ teachers or students during the summer months. One high school freshman who won first place in zoology at the Southern Arizona Regional Science Fair is having his work published by the *American Bee Journal*. (8) Wescon (17) invites promising future engineers and their teachers to participate in the national convention, and, as previously mentioned, the AMA invites its two top winners to the national AMA convention.

Hughes Aircraft Company in Tucson invites several teachers to work with its engineers during the summer months and pays them for the time they are employed. Employment of the AMA Award winners by pharmaceutical companies has previously been mentioned.

An increasing number of summer laboratory jobs are available to teen-age scientists in universities, industry, and government. In 1958, 70 per cent of these employed students had not entered college. (6) Organizations wishing to employ the 1959 Science Talent Search Winners can contact the Science Clubs of America. Sometimes the young people continue work begun as a science fair project, and some have been assigned "classified" work at Cape Canaveral, Dow Corning Corporation, and Melpar. Other organizations which have participated in this program are the Infectious Disease Laboratories of the University of Iowa, the University of Arizona College of Pharmacy, Eli Lilly and Company, the National Bureau of Standards, Texas Eastern (pipeline) Transmission Corporation, Cumberland Optical Company, Warner and Swasey Observatory, and

the Westinghouse Research Laboratories. To summarize briefly—the value of the students' and teachers' contact with, and the assistance of interested and qualified scientists (will it be a pharmacist?) cannot be overemphasized.

In order to promote this contact the authors wish to suggest the following:

1. Professional pharmacy should prepare pharmacy-oriented laboratory manuals (15) at the elementary, junior high, and senior high school levels.
2. The manual should indicate a source for the chemicals and equipment listed.
3. Every school of pharmacy should list a faculty member who would be available to assist secondary teachers and their students in preparing science fair projects.
4. Local science fair winners in the pharmacy-related fields should be invited to attend a local pharmaceutical organization banquet or perhaps a pharmacy college Rho Chi banquet.
5. The local pharmacists should display the better science fair projects in their pharmacies.

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You will make a better impression, and you will do better work if you use care in everything you do, even if you don't accomplish quite as much.

Robert A. Hardt, *Am. J. Pharm. Ed.*, 12, 293 (1948)

PREDICTION OF SCHOLASTIC ACHIEVEMENT IN PHARMACY AT THE UNIVERSITY OF KENTUCKY

ERNEST D. McDANIEL AND HOWARD W. STEPHENSON

INTRODUCTION

The careful selection of those candidates most likely to succeed in pharmaceutical education is important not only to society, but also to the educational institutions and individual students involved.

The present study seeks to review briefly the recent published research and to report the results of pharmacy prediction studies at the University of Kentucky.

BRIEF REVIEW OF PAST WORK

An early effort to describe traits necessary for pharmacists was made by Charters, Lemon, and Monell (1) in 1927. These authors set forth an "inventory of personal traits" to be utilized in a self-analysis chart for pharmacists.

Eight years later a "Committee on Predictive and Achievement Tests" was established by the American Association of Colleges of Pharmacy to determine the traits predictive of success in pharmaceutical education. (2)

During the period following World War II, a comprehensive, nationwide attempt was made to study the abilities, aptitudes, interests, personality characteristics, and other factors necessary for success in pharmacy curricula. This study was carried on by Dr. H. H. Remmers, assisted by Dr. N. L. Gage and A. J. Drucker, of Purdue University. These "student personnel studies," launched in 1946 as a part of The Pharmaceutical Survey, have provided an invaluable point of departure for subsequent pharmacy prediction research undertaken by individual institutions. (3, 4, 5)

Upon the basis of the final validation study of the Survey's predictive testing program (5), Remmers and Drucker formulated the following conclusions:

1. The battery of tests administered to the entering pharmacy freshmen is substantially predictive of scores on the Senior Comprehensive Examination four years later.*
2. There is some indication that within a single institution, the predictive battery may successfully predict to some extent the grades (over-all, pharmaceutical only, nonpharmaceutical only, and senior grades) of students completing the program. It is not possible to provide, however, a national formula for the prediction of such grades, for grading systems from institution to institution, even when they appear to be comparable are, in fact, not comparable.
3. There is some indication that the predictive battery does a better job of predicting nonpharmaceutical than pharmaceutical grades.
4. For many institutions participating in the study, the amount of relationship existing between scores on the Senior Comprehensive Examinations and grades given in corresponding courses is substantial, indicating that grades and the examinations are not mutually exclusive indices of success in pharmaceutical training.
5. The battery of predictive tests used in this and previous studies of The Pharmaceutical Survey is of value in predicting which students will survive the four-year training period in some institutions and is of negligible value in other institutions. The Purdue Mathematics Training Test and the Purdue Physical Science Test have been most successful in predicting survival in pharmacy both after two and after four years of training.

The following chart presents a quick, longitudinal summary of the results of pharmacy prediction studies from 1946 to the present (Table I).

* The five tests included in the predictive battery of the validation study were:

- 1) The A.C.E. Psychological Examination for College Freshmen, 1946 Ed.
- 2) The Cooperative English Test, Form PM.
- 3) The Purdue Mathematics Training Test, Form XM.
- 4) The Purdue Physical Science Test, Form AM.
- 5) The Pharmacy Background and Personal Data Blank.

TABLE I. CHART SUMMARIZING PHARMACY PREDICTION STUDIES

Institution	Best Single Predictor	Criterion	Sample N	Single r	Multiple R	Tests Used in Battery
University of Utah Ralph (6)	Cooperative Natural Science	Grade Point Average, pharmacy courses only, students completing one or more quarters in the pharmacy curriculum.	76	.457	—	Iowa Chemistry Aptitude Cooperative English Cooperative Social Studies Cooperative Natural Science Cooperative Mathematics
Jex (7)	Iowa Chemistry Aptitude	First Quarter, Grade Point Average, pharm- acy courses only.	40	.632	—	Same as above
Taylor, et al. (8)	GATB- General Intelligence	Grade Point Average, pharmacy courses only, through sophomore year, College of Pharmacy.	101	.396	.413	General Aptitude Test Battery General Intelligence Verbal Aptitude Numerical Aptitude
University of Kentucky Kelly (9)	Kentucky Classification Battery-Mathe- matics Score	Final Cumulative Grade Point Average (pharmacy courses only) through graduation (3 years) or until withdrawal from College of Pharmacy.	55	.524	.566	Kentucky Classification Battery General Ability English Mathematics General Aptitude Test Battery Numerical Aptitude Clerical Perception
St. Louis College of Pharmacy and Allied Sciences Defoe and Mercer (10)	Local Mathe- matics Test	Honor-Point Ratio, all courses through graduation.	294	.382	.443	Local Mathematics Test Cooperative English Mechanics of Expression Cooperative General Science Test ACE Psychological Examina- tion "L" Score
Temple University School of Pharmacy Reppert (11)	Temple Univer- sity Chemical Memory Test	First Semester, Grade Point Average.	87	.620	.760	Ohio State Psychological Examination Reading in Natural Sciences Temple University High Level Arithmetic Temple University Chemical Memory Test

CHART SUMMARIZING PHARMACY PREDICTION STUDIES (continued)

Institution	Best Single Predictor	Criterion	Sample N	Single r	Multiple R	Tests Used in Battery
George Washington University School of Pharmacy Hall (12)	Ohio State Psychological Examination, Part III	Combined Grade Point Average, first two years in pharmacy.	74	.510	.610	ACE Psychological Examination Ohio State Psychological Examination, Part III Iowa Chemistry Test
	Test of Numerical Relationships and Concepts	Combined Grade Point Average, first two years in pharmacy.	152	.446	.650	Test of Vocabulary Strength Test of General Study Reading Skill Test of Fractions and Decimals Test of Numerical Relationships and Concepts Test of Clerical Ability
Long Island University Brooklyn College of Pharmacy Danneskold and Mills (13)						
University of Illinois College of Pharmacy Perkins (14)	ACE Chemistry Placement Examination	College Chemistry Grade Point Average.	290	.518	.643	ACE Psychological Examination Iowa Mathematics Test ACE Chemistry Placement Examination High School Grade Point Average

Although recent studies have been conducted at Columbia (11), Rutgers (11), the University of North Carolina (15), and the University of Florida (15), the results are not reported in a manner which would permit tabulation.

BRIEF SUMMARY OF CHART

The best single test predictor appearing in the above chart is the *Iowa Chemistry Aptitude Test* reported in the Jex study at the University of Utah. The criterion used by Jex was first quarter grades in pharmacy courses only.

The second best single test predictor of pharmacy success reported above is the *Chemical Memory Test* developed at the Temple University School of Pharmacy. A correlation coefficient of .62 with the criterion of first-semester grade point averages (GPA) was obtained in 1952 with an N of 87 out of the 110 students admitted. As would be anticipated, the correlation was reduced for successive semesters: .57 against second-semester GPA; .52 against third-semester GPA. The coefficient of correlation was .47 for the *Chemical Memory Test* plotted against the first-semester GPA of the entering class of 1953. It should be noted that the predictive test battery was employed in the selection of the entering freshmen classes of 1952 and 1953.

The Temple University test battery yielded multiple correlation coefficients of .76 against first-semester GPA for the entering class of 1952 and .63 for the entering class of 1953.

A multiple correlation coefficient of .65 was obtained by the Psychological Corporation's predictive test battery at the Brooklyn College of Pharmacy against a criterion of the combined GPA for the first two years of pharmacy training. The extent to which the battery was used in selecting classes, as was the case at Temple University, is unknown.

Combined GPA for the first two years of pharmacy training was used as the criterion for the predictive test battery at the George Washington University School of Pharmacy (12), yielding a multiple correlation coefficient of .61.

Both the *Temple University Chemical Memory Test* and the Brooklyn College of Pharmacy *Test of General Study-Reading Ability* represent creative approaches to pharmacy prediction. Both of these tests attempt to reproduce experimentally the actual "study-examination" conditions of pharmacy study and, presumably, add a significant measure of heterogeneity to the predictive battery.

The work at Utah (8) and Kentucky (9) represents additional attempts to extend predictive testing beyond conventional measurement instruments by the inclusion of the *General Aptitude Test Battery*, but the results have been generally disappointing.

Academic aptitude and achievement tests have enjoyed more extensive use and have given better predictions than tests designed to measure interest, personality, and specific aptitudes. As Remmers suggests, however, the hope for significant improvement in prediction lies in the combination of tests with low intercorrelations, and it is probable that such hope will be realized when we are able to include in our batteries tests measuring other dimensions of the individual than those associated with academic ability.

PRESENT STUDY: SUBJECTS, TESTS, PROCEDURE

In the hope of developing a pharmacy prediction battery employing tests of considerable diversity, the University of Kentucky has administered an experimental battery of tests to all applicants for the College of Pharmacy since 1948. As there has been some change in the tests utilized from time to time, this study is confined to those students entering the College of Pharmacy as first-year pharmacy students (second-year college students) from 1954 through 1956. As the number of places available closely approximated the number of applicants, limited selection was exercised in admitting students. The experimental battery was designed to obtain a measure of academic aptitude, specific aptitude, interest, and personality for each applicant. The tests selected to obtain a measurement of each of these areas are briefly described:

Area	Test	Description
Academic aptitude and achievement	Kentucky Classification Battery (16)	A general test of ability and achievement requiring 90 minutes of testing time. Four scores: General Ability, English, Mathematics and Total.
Specific Aptitudes	General Aptitude Test Battery (17)	Developed by the United States Employment Service; nine scales: General Intelligence, Verbal Aptitude, Numerical Aptitude, Spatial Aptitude, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity.
Interest	Work Interest Analysis (18)	An experimental measure of interest yielding 18 scores of which three were employed in this study: Laboratory Science, Business Science, and Sales.
Personality	Heston Personal Adjustment Inventory (19)	A self-report personality inventory yielding scores for six scales: Analytical Thinking, Sociability, Emotional Stability, Confidence, Personal Relations, and Home Satisfaction.

The inclusion of the *Kentucky Classification Battery* and the *General Aptitude Test Battery* in this study represents a replication of Kelly's study of pharmacy prediction at the University of Kentucky and, to some extent, the work of the Utah group. The inclusion of the *Work Interest Analysis* is an attempt to validate an experimental instrument. The *Heston Personal Adjustment Inventory* has not been previously reported in pharmacy prediction studies.

Combining the entering pharmacy classes of 1954 through 1956 (N-151), intercorrelations were computed for all scores obtained from the above tests. Validity coefficients for these test scores and first-semester grade point averages were computed. Additional validity coefficients were computed using final senior standings as these classes reached graduation status in the springs of 1956, 1957, and 1958. Thus, the intercorrelation of all test scores and the value of each test score in predicting both first-semester standing and over-all standing at time of graduation were obtained. The results are presented in Table II.

TABLE II
INTERCORRELATIONS AND VALIDITY COEFFICIENTS OF PREDICTOR VARIABLES

	GA	E	M	T	I	VA	NA	SA	FP	CP	MC	FD	MD	LS	BS	S	AT	C	S	PR	ES	HS	So. Se. GPA	
Kentucky Classification Battery:																								
General Ability	62	50	86	62	69	38	18	13	33	04	02	-12	02	02	20	-03	22	12	-04	08	08	-12	34	20
English	62	62	85	49	58	40	13	17	35	11	-01	03	04	09	-16	25	25	00	-09	01	00	-03	35	37
Mathematics	62	62	82	47	41	49	09	13	35	14	05	15	00	08	-16	09	04	-13	08	04	04	-05	31	29
Total	62	62	63	67	49	15	16	40	11	02	01	02	15	-12	22	07	-10	07	05	05	-09	39	34	
General Aptitude Test Battery:																								
Intelligence	62	50	86	62	69	38	18	13	33	04	02	-12	02	02	20	-03	22	12	-04	08	08	-12	34	20
Verbal Aptitude	62	62	85	49	58	40	13	17	35	11	-01	03	04	09	-16	25	25	00	-09	01	00	-03	35	37
Numerical Aptitude	62	62	82	47	41	49	09	13	35	14	05	15	00	08	-16	09	04	-13	08	04	04	-05	31	29
Spatial Aptitude	62	62	63	67	49	15	16	40	11	02	01	02	15	-12	22	07	-10	07	05	05	-09	39	34	
Form Perception	62	62	63	67	49	15	16	40	11	02	01	02	15	-12	22	07	-10	07	05	05	-09	39	34	
Clerical Perception	62	62	63	67	49	15	16	40	11	02	01	02	15	-12	22	07	-10	07	05	05	-09	39	34	
Motor Coordination	62	62	63	67	49	15	16	40	11	02	01	02	15	-12	22	07	-10	07	05	05	-09	39	34	
Finger Dexterity	62	62	63	67	49	15	16	40	11	02	01	02	15	-12	22	07	-10	07	05	05	-09	39	34	
Manual Dexterity	62	62	63	67	49	15	16	40	11	02	01	02	15	-12	22	07	-10	07	05	05	-09	39	34	
Work Interest Analysis:																								
Laboratory Science	62	50	86	62	69	38	18	13	33	04	02	-12	02	02	20	-03	22	12	-04	08	08	-12	34	20
Business Science	62	62	85	49	58	40	13	17	35	11	-01	03	04	09	-16	25	25	00	-09	01	00	-03	35	37
Sales	62	62	82	47	41	49	09	13	35	14	05	15	00	08	-16	09	04	-13	08	04	04	-05	31	29
Heston Personal Inventory:																								
Analytical Thinking	62	50	86	62	69	38	18	13	33	04	02	-12	02	02	20	-03	22	12	-04	08	08	-12	34	20
Confidence	62	62	85	49	58	40	13	17	35	11	-01	03	04	09	-16	25	25	00	-09	01	00	-03	35	37
Sociability	62	62	82	47	41	49	09	13	35	14	05	15	00	08	-16	09	04	-13	08	04	04	-05	31	29
Personal Relations	62	62	63	67	49	15	16	40	11	02	01	02	15	-12	22	07	-10	07	05	05	-09	39	34	
Emotional Stability	62	62	63	67	49	15	16	40	11	02	01	02	15	-12	22	07	-10	07	05	05	-09	39	34	
Home Satisfaction	62	62	63	67	49	15	16	40	11	02	01	02	15	-12	22	07	-10	07	05	05	-09	39	34	
Sophomore Grade Point Average																								
Average	62	50	86	62	69	38	18	13	33	04	02	-12	02	02	20	-03	22	12	-04	08	08	-12	34	20
Senior Grade Point Average																								
Average	62	50	86	62	69	38	18	13	33	04	02	-12	02	02	20	-03	22	12	-04	08	08	-12	34	20

DISCUSSION

It is instructive to note that measures of academic ability and achievement retain their position as the best predictors of first-semester grade point averages. The total score of the *Kentucky Classification Battery* and the verbal score of the *General Aptitude Test Battery* are about equal in leading the other tests with validity coefficients of .39 and .38, respectively. The Intelligence score of the *General Aptitude Test Battery* is the third best single predictor of first-semester grade averages with a validity coefficient of .36.

All three sub-tests of the *Kentucky Classification Battery* have validity coefficients which are significant at the one per cent level. Clerical perception of the *General Aptitude Test Battery* was the only other variable of the twenty-two studied which had a validity coefficient which was significant at the one per cent level (.22). Because of the relatively low intercorrelation of Clerical perception with the other significant predictor variables, this score was combined with the *Kentucky Classification Battery* total score and the *General Aptitude Test Battery* verbal score to give a multiple correlation of .42 with first-semester grade point averages.

Little promise is shown for the other measures of specific aptitude, interest, or personality employed in this study with the possible exception of the analytical thinking score of the Heston. While this score is not significantly related to first-semester grade averages, it does appear as a statistically significant predictor of over-all standing at the senior level at the one per cent level of confidence.

Further examination of the relationship between the predictor variables and senior standings indicates an elevation in the importance of KCB English, GATB numerical, and GATB clerical perception as predictors of this criterion. Finger dexterity and manual dexterity are significant at the five (5) per cent level in predicting final senior standings.

The correlation of .78 between sophomore grade average (first-semester pharmacy) and senior grade averages is, to some extent, an index of grade reliability although it must be recognized that this correlation is artificially high since the senior grade average includes the sophomore standings.

SUMMARY

An attempt has been made to extend the repertory of predictive tests used in pharmacy school selection by exploring tests of specific aptitudes, interests, and personality as possible predictors of success in pharmacy studies. Tests in these areas had generally low validity coefficients in relationship to first-semester grade point averages. The various scales of the *Work Interest Analysis* and the *Heston Personal Adjustment Inventory* did not yield significant correlations with the criterion of first-semester grade point averages.

A multiple correlation coefficient of .42 was obtained between first-semester grade averages and the total score of the *Kentucky Classification Battery*, the verbal score and the clerical perception score of the *General Aptitude Test Battery*.

Among the nonintellectual factors studied, there are indications that analytical thinking of the *Heston Personal Adjustment Inventory*, and finger dexterity and manual dexterity of the *General Aptitude Test Battery* may have some utility in predicting final senior standings in the college of pharmacy at which this study was conducted.

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I feel that we should not forget that man, as contrasted with other animals, is characterized by an exceptionally long period of immaturity—which is one of the reasons why he can learn so much, eventually.

Earl J. McGrath, *Am. J. Pharm. Ed.*, 13, 135 (1949)

ADVENTURES IN COURSE AND CURRICULUM BUILDING I. VISITING LECTURER SERIES

HENRY M. BURLAGE

What you can do, or dream you can, begin it. Boldness has genius, power,
and magic to do it. Goethe

The need of an exchange of ideas and opinions relating to the education of pharmacists and the advances in the practice of pharmacy has long been recognized. The writer was a member of a committee of the American Association of Colleges of Pharmacy to study ways and means of promoting exchange professorships between the member colleges and schools, but little came of these efforts. Several years ago the writer also attempted to interest the colleges and schools in his state and surrounding ones in arranging a lecture series similar to that sponsored by the American Chemical Society. The need is especially great in this area, in spite of modern methods of transportation.

Of course, the Teachers' Seminars sponsored regularly by the American Foundation for Pharmaceutical Education and the American Association of Colleges of Pharmacy have accomplished a great deal in bringing about exchanges of ideas between teachers in various areas. However, the need to translate ideas and trends to the students in the colleges and schools of pharmacy is especially urgent in the changing world of today.

Therefore, since the College of Pharmacy at the University of Texas had in its budget funds for a position which was left vacant for 1957-58 by an unexpected resignation, and because the University of Texas was developing plans to celebrate its seventy-fifth anniversary in 1958 and to promote *an excellence in teaching program* during this period, the Vice President of the University was asked in October, 1957, to permit the College of Pharmacy to use these unexpended funds "to pay for lectureships in the pharmaceutical sciences and pharmaceutical education . . . discussing the advances and other facets of the industry." This request was granted.

Immediately, the Curriculum Committee of the College recommended to its faculty: (1) the approval of an elective course, "A Proseminar in Pharmaceutical Problems," with three semester-hours credit, open to seniors, and to juniors by permission of the Dean; (2) that attendance to the lecture be required of all graduate students as partial credit for a seminar, a requirement for all graduate students; and (3) that all members of the College faculty be urged to attend the lectures.

Furthermore, it was decided that the lectures should be devoted to pharmaceutical problems in the respective teaching divisions—pharmacy, pharmacy administration, pharmaceutical chemistry, pharmacognosy, and pharmacology, to hospital pharmacy, and the final lectures of the series to the pharmaceutical curriculum and the graduate program.

Seven groups of lectures were scheduled; three to four one-hour periods for each group were scheduled, depending upon the need of the lecturer and on the interest of the listeners. It was also decided that the first lecture of the series must be of such a nature that the student body should

attend a convocation, where it would be given. Each series was to be followed by a meeting at which a member of each teaching division would present an "overview" of the lectures with discussion by the students, and during a following period an examination was given over the material presented.

The series of lectures was scheduled for the spring semester of 1958, and each visiting lecturer was offered travel expenses (tax exempt) and an honorarium, which seemed adequate, for the three lectures. The response of the lecturers selected by the divisions was very enthusiastic, and with an impression that it was considered an honor to be selected. In a busy class schedule, scheduling of the lectures presented—and still presents—a problem.

All lectures were tape recorded for future class use. Each lecturer was asked to present outlines of his lectures to distribute to members of the class and to furnish at least one copy of each lecture for possible publication; this presented a problem since only two speakers complied with the request and one requested that his lectures not be published. Three thousand copies of one series were printed, as were seven thousand copies of another series, which were sent to all registered pharmacists of the state, as well as to others. The speakers were also asked to furnish the Dean's office with suitable biographical sketches and photographs for publicity purposes, outlines of the lectures, and to state the type of lecture room equipment desired.

The student advisors were of considerable help in recommending the lectures for elective credit, with the result that fifteen undergraduate students and ten graduate students took the course for credit. It is estimated that 425 students heard each of the first lectures of each series, and that about forty persons heard each of the remaining lectures. Following is a list of the topics and lecturers who accepted their appointments:

Problems in Pharmacy (Formulation and Technology)

Dr. Albert M. Mattocks, Professor of Pharmacy,
University of Michigan

Problems in Hospital Pharmacy

Mr. Daniel F. Moravec, Director of Pharmacy Service,
Lincoln General Hospital, Lincoln, Nebraska

Problems in Pharmacology

Dr. Ewart A. Swinyard, Professor of Pharmacology,
University of Utah

Problems in Pharmaceutical Chemistry

Dr. Kenneth N. Campbell, Director, Medicinal Chemistry,
Mead Johnson & Company, Evansville, Indiana

Problems in Pharmacy Administration

Dr. Albert Fisher, Research Director, National
Wholesale Druggists' Association

Problems in Pharmacognosy

Mr. John E. Seybert, Formerly Chief Pharmacognosist,
Eli Lilly & Company, Indianapolis, Indiana

Problems in Pharmaceutical Education and Graduate Study

Dr. Melvin Green, Director of Educational Relations,
American Council on Pharmaceutical Education

At the end of the entire series, the students taking the course for credit, the graduate students, the faculty, and the visiting lecturers were requested to answer a questionnaire (see Questionnaires I and II). The lecturers showed much interest in this adventure and commented favorably on it, and some even suggested that our experience in this respect be published—hence this effort. Student interest was unusually high as measured by the replies received to the questionnaire.

The faculty of the College was pleased to have approved in the budget for 1958-59 funds that would make a second series of lectures possible, and plans were laid much earlier than for the first series. The theme of the series was chosen to be "Advances in the Pharmaceutical Sciences," with the following schedule of topics and lecturers chosen:

Hospital Pharmacy

Dr. Robert Bogash, President of the American Society for Hospital Pharmacists

Pharmacology

Dr. Thomas J. Haley, Chief, Division of Pharmacology and Toxicology, Atomic Energy Project, University of California

Pharmaceutical Chemistry

Dr. John E. Christian, Professor of Pharmaceutical Chemistry, Coordinator of Bionucleonics Research, Purdue University

Pharmacy Administration

Dr. Stephen Wilson, Dean, College of Pharmacy, Wayne State University

Pharmacy

Dr. Sidney Riegelman, Associate Professor of Pharmacy and Pharmaceutical Chemistry, School of Pharmacy, University of California

Pharmacognosy

Dr. Heber W. Youngken, Jr., Dean, College of Pharmacy, University of Rhode Island

Pharmaceutical Industry, Education, and Graduate Study

Dr. Rudolph H. Blythe, Director of Pharmaceutical Research, Smith Kline and French Laboratories

The curriculum committee and the faculty of the College deemed it advisable to expect only the junior and senior students to attend the opening lectures of the speakers, but because of interest and the nature of the lectures, the committee and faculty reversed their decision and voted to expect attendance of all students at the opening lectures, as was the case in the first series. Some changes in the schedule for the lectures were made, and more visitors attended the lectures than did for the first series. The number of undergraduate students registered for the course for this second series was twelve, and the number of graduate students registered was ten. The first lectures were attended by about 475 students.

CONCLUSIONS

a. On the basis of opinions by the visiting lecturers, faculty, students, visitors, and others, such a program is recommended for consideration by other faculties of colleges and schools of pharmacy;

b. There has been a stimulation of interest and worthwhile discussion of the topics outside of the classroom;

c. The broadening aspects of the program are apparent and of inestimable value;

d. The program should not be attempted without sufficient funds, without adequate planning, without the cooperation of the entire faculty, and without some sacrifice on the part of each faculty member.

QUESTIONNAIRE NO. I

Pharmacy 360M-296B Questionnaire
(Your answers will be held confidential)

1. Do you feel that the Proseminar should be continued?
Yes..... No.....
2. Do you feel that it should be offered in combination with the convocations, as was the case this year?
Yes..... No.....
3. Have you any suggestions for improving the proseminar? Be specific.
(a)
(b)
(c)
4. Have you any suggestions as to topics to be covered by the lecturers? Be specific.
(a)
(b)
(c)
5. Were the "over-view" meetings satisfactory and helpful?
Yes..... No.....
6. Please rate the lecturers on their presentation from 1 to 5 (where 5 means excellent, 3 is average and 1 is poor).

Additional Comments:

QUESTIONNAIRE NO. II

Visiting Lectureship Series
College of Pharmacy
The University of Texas

1. Do you feel that the first lecture of the series should begin with the all-student convocation, or should the series be open *only* to advanced and graduate students in the College?
2. Do you feel that such a lectures series should be encouraged as an over-all project in all Colleges/Schools of Pharmacy?
Yes..... No.....
3. Have you suggestions as to what the theme of the next series should be? Please be specific.
4. Please submit the names of persons whom you feel qualified to develop the theme you mention in (3).
5. We are anxious that our visiting lecturers be pleased with our attentions to them during their visits with us. If we had the funds, we are certain that we could do more for them. Please make any suggestions that will make them leave with pleasant recollections and an awareness of what the College of Pharmacy and the University of Texas are trying to do in fulfilling their obligations as a state university in the world of today.
6. Other suggestions:

IMPROVING THE PHARMACY CURRICULA BY RESTRUCTURING OF LABORATORY PERIODS

JEAN BROWN AND ANN LOWE

Expansion and revision of the educational program is not a new objective in pharmacy. Throughout its history our profession has constantly sought to improve its professional standards by various means. It is not surprising in this age of rapid scientific and cultural development to find the trend in pharmaceutical education is toward expansion of the curriculum and changes in teaching methods in an effort to improve the profession as a whole. As Dr. Paul Briggs said in his Remington Medal acceptance address, "Education, in any field, must be geared to the academic background of the student; the intended utilization of the knowledge; and the moral obligation of teachers to provide preparation for living, as well as preparation for working."⁽¹⁾

It is an undisputed fact that time is one of our most valuable possessions. How we use it may mean the difference between success and failure in any undertaking. As pharmacists have become aware of their educational inadequacies, the college programs have been lengthened. The extension of time can be easily traced. In 1925 three years of college work was thought necessary and, subsequently, in 1932 another year was added to the requirements for a degree. Recently the five year course was approved, and in 1960 every accredited college of pharmacy in the United States will be operating under this plan. Perhaps the answer to lack of time for needed college courses necessary for a well-rounded pharmaceutical education is not only added hours but proper and more thoughtful utilization of the hours we already have available.

Seventeen years ago Dr. Morris Fishbein recognized the need for more cultural courses in the already crowded four year curriculum when he wrote, "the trend today is toward more and more cultural education. Only by such cultural education preliminary to a professional course can a young man be imbued with the ideals necessary to practice a profession as a profession should be practiced. One cannot establish these ideals in the crowded professional course."⁽²⁾ It is true only the liberally educated individual can have a real appreciation of our cultural heritage and in an effort to improve the cultural background of the future pharmacists' attention has been focused on the need for more general education in the undergraduate program.

A variety of such subjects is necessary if the pharmacist is to be educated as well as professionally trained. To quote from an article entitled, "Pharmaceutical Education," in the *Practical Edition, Journal of the American Pharmaceutical Association*, "Polished human beings who respect the sensibilities of others have acquired richness of personality through study of ancient classics, grammar, rhetoric, poetry, linguistics, and other disciplines which facilitate not only the more delicate shades of intercourse between men, but also human relations in general."⁽³⁾ These courses help prepare the student for leadership in society on a social and intellectual plane and when correlated with professional training prepare him for a more effective life.

The need for more time, as well as more time for electives, seems to have been well established in the minds of most educators in pharmacy. This need was to have been resolved by the adoption of the five year course.

However, it becomes increasingly evident as some adopt the plan and others attempt to prepare suitable curricula for 1960, that the problem has been lessened but not solved. Dr. Linwood Tice said in a recent article, "Indeed, it would not be surprising if the six year program leading to a doctorate of pharmacy degree now adopted on the west coast might someday become the national pattern." (4) In the same article he comments that, "The educational requirements of a pharmacist, however, must not be advanced more rapidly than the profession can be adapted to it." (4)

The adoption of the five year program was enthusiastically supported by those who recognized the need for a curriculum with more cultural depth than that provided by the four year course which is crowded with professional and service courses of a scientific nature. However, a study of the curricula of the colleges of pharmacy already using the five year plan indicates a strong tendency to add more scientific courses rather than to allow more time for electives, and to quote Dr. Tice again, "specialized training must not be permitted to crowd out the general education which, finally and after great effort, is now to be made part of the pharmaceutical curriculum for it was this need that was cited most frequently by those arguing the adoption of the five year pharmacy program." (4)

Before another extension of time in college of pharmacy requirements is regarded as a necessity, it might be well to examine our present teaching methods with a critical eye. It has been said that it is a bad plan that admits no modification. Certainly no one can deny the necessity of our professional courses and their service course requirements. They should not be slighted. However, it is always possible that they could be improved. Dr. Paul Briggs, in one of his recent addresses, said, "The faculties should courageously and constantly experiment to discover better and faster teaching methods." (5) Most educators are aware of this responsibility and many are accepting the challenge.

Since laboratories in the colleges of pharmacy are of paramount importance, it is essential that they be maintained at a high level of efficiency, and any change made must be carefully planned and regarded as experimental until its value is established. Also, to develop faster teaching methods without sacrificing quality or quantity may pose a difficult problem. The remainder of this paper will be devoted to the idea of making more time available through shorter laboratory periods. As a matter of fact, it is possible that three-hour laboratory periods are outdated, outmoded and unnecessary, and that the laboratory periods should be restructured.

It is impossible for us to control the laboratory hours in our service courses, but some faculties in other departments have already put into effect the idea that laboratory periods may be shortened without jeopardizing the value of instruction. At the University of Oklahoma some of the three-hour bacteriology laboratories, for which one hour of credit is given, have been reduced to two-hour laboratories. The plant science, or botany, laboratories in the beginning courses have combined laboratories with lectures and use a demonstration-lecture hour. Much effort and time have been devoted to the development of this program which is now considered one of the most effective in the beginning science courses. Dr. Neuroth of the Medical College of Virginia has said, in speaking of effective teaching in pharmacy laboratories, "Demonstration accompanied by class discussion is

applicable to laboratory instruction." (6) It is not suggested here that our laboratories in pharmacy can be cut to one hour but it seems reasonable that two hours may be sufficient and that a demonstration-lecture technique sometimes may be profitably employed.

Dr. William J. Husa, head of the Department of Pharmacy at the University of Florida, said in a recent communication to the writer, "For over twenty years we used three-hour laboratory periods in dispensing, but about twelve or fourteen years ago we went to two-hour periods, which have worked quite well. We did not encounter any difficulties in changing to the two-hour periods." Since Dr. Husa is one of the foremost authorities in dispensing pharmacy, it is gratifying to have his approval of the use of two-hour periods in this particular area and to know they have been successfully used for several years at the University of Florida.

At the University of Oklahoma during the fall semester 1957-58, the two-hour period was used experimentally in dispensing laboratory. This was in a more or less disguised and cautious manner since one hour of the three-hour period was devoted to the study of new pharmaceutical products, and only the two remaining hours were spent in actual laboratory work. The results were so satisfactory that this second semester we scheduled the laboratory periods for only two hours. The success of the shorter periods depends on careful planning and thoughtful selection of prescriptions and requires maximum accomplishment on the part of the student during the two hours.

Every student in pharmacy accepts the hours spent in laboratory as a necessary segment of his professional training. Most teachers accept it as a part of their contribution to the proper training of the student. Possibly few have stopped to consider that a reduction of these hours could be the partial answer, at least, to the need for more time for a well-balanced program of pharmaceutical education.

In an effort to show what could be accomplished by a reconstruction of laboratory periods, by reduction of hours, 10 per cent of the colleges of pharmacy in the United States were surveyed through their current catalogs. The colleges used in the survey were chosen to represent various segments of the United States. The schools included are all on the four year program using the semester hour system. Some schools on the five year schedule, which are still in the minority, were studied to learn what is being included in the fifth year of study and to determine the new trend in pharmaceutical education. Columbia University College of Pharmacy was used as a control comparison since it uses two-hour periods for which one hour of credit is earned.

The result of the study shows that a pharmacy student, in his six semesters in a four year college of pharmacy that requires three contact hours for one semester credit hour, spends a total range of 672 to 995 contact hours in pharmacy laboratories alone. This is in addition to the hours he spends in his service course laboratories. This means an average of 775.5 contact hours is spent in pharmacy laboratories during the six semesters. For that number of contact hours the student receives from 14 to 29.5 semester hours credit, or an average of 16.6 semester hours. These hours represent only slightly more than 12 per cent of 137.4 which is the survey average number of semester hours required for a degree in the four year

schools. It is interesting to compare these figures with those obtained from the survey of Columbia University with its two-hour laboratories for which one hour of credit is given. Here, 22.5 semester credit points are earned for 676 contact hours in pharmacy laboratories. This is slightly less than 15 per cent of the 152 semester credit points necessary for graduation with a B.S. in Pharmacy degree, which is over 3 per cent more credit for 99.5 less contact hours based on the survey averages.

By this reduction in laboratory hours in the seven four year curricula studied, an average of 44.8 contact hours per semester could be released for other purposes. The study of one school, using the five year plan and three-hour laboratory periods, showed 784 contact hours for which sixteen hours credit was given in a 162-hour degree program. Here a reduction to two-hour laboratories would have released 43.53 contact hours per semester. This is an impressive number of hours in the planning of any curriculum and certainly merits serious consideration by educators. Other advantages may become apparent in the experiment for shorter laboratory periods. It seems possible that this may prove to be a better teaching method as well as a faster one. The student will learn to plan his work in an orderly fashion and to work with more concentration and precision in order to accomplish the assignment. This effort should result in less waste of time. The change would also require careful planning, and revision of laboratory work on the part of the instructor. The two-hour period would necessitate having everything in order for work to begin immediately at the opening of the period.

It seems appropriate to say that the effective utilization of the time made available by shorter laboratory periods will require careful implementation and readjustment of credit hours in each curriculum, and this is particularly pertinent since most of the colleges of pharmacy are now in the process of perfecting their five year programs. It may be reasonable that the sixteen hour semester load, which is strongly favored, could be extended to eighteen if less time is required in the laboratories.

The faculties of the colleges of pharmacy may have a partial answer for an enriched pharmaceutical education within their own hands if they are willing to experiment to discover better and faster teaching methods. The Committee on Problems and Plans of the American Association of Colleges of Pharmacy might find this restructuring of laboratory time an important subject for its consideration. The writer had discussed this as a possibility with the late Dean Lyman, who was chairman of this Committee for many years. As a matter of fact, the following quote from one of his letters written on September 10, 1957, shows his reaction to the idea. "Your suggestion concerning the academic and teaching credit for laboratory teaching, I agree with heartily. The laboratory work should be so planned that it makes an appeal to the student as being something worthwhile, and not make him feel it is a matter of putting in so much time. I am satisfied that the ingenious teacher could conduct the laboratory so that what is now usually slated for a three-hour period could be done in two hours more effectively." Also, in the same letter he said, "I am not so sure but that this is the major problem for our whole Committee to work on at this time." Dean Lyman was the pioneer of many innovations in pharmaceutical education. His endorsement of these ideas stimulated the survey as reported in this paper.

TABLE I. STUDY OF PHARMACY CURRICULA OF EIGHT SCHOOLS (INCLUDING CONTROL) USING SEMESTERS HOURS AND FOUR YEAR PLAN TO SHOW HOURS MADE AVAILABLE BY REDUCTION OF THREE-HOUR LABORATORY PERIODS TO TWO-HOUR PERIODS

University Four Year Plan for B.S. in Pharmacy Degree	Hours of Laboratory for One Hour Credit	Credit Hours for B.S. Degree	Number of Weeks in Semester	Semesters with Pharmacy Labs.	Total Con- tact Hours in Pharmacy Labs.	Total Credit Hours for Pharmacy Labs.	Contact Hours Saved Per Se- mester by Use of Two-Hour Pharmacy Labs.
Survey Control School	2	152	16	6	676	22.5	
School A	3	136	15	6	690	16	38.3
School B	3	130	16	6	704	14	39.11
School C	3	142	16	6	672	14	37.33
School D	2 and 3	138	16	7	995	29.5	47.41
School E	3	130	16	6	752	11	41.77
School F	3	146	16	6	880	19	48.66
School G	4	140	16	6	736	13	61.33
Survey Averages		137.4			775.5	16.6	44.8

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Even in some freshman courses in pharmacy a student considers himself to all intents and purposes a pharmacist. He begins to feel an emotional and intellectual identification with the other members of his class, with the members of the faculty, and with the profession at large. This feeling of belonging adds incentive to his studies, even those not directly related to specialized professional activities.

Earl J. McGrath, *Am. J. Pharm. Ed.*, 13, 134 (1949)

EDUCATION BY COERCION.
EFFECTIVE METHODS OF INCREASING ATTENDANCE
AT ADULT EDUCATION PROGRAMS THROUGH
INCREASED SERVICES AND EXPANDED
PROMOTIONAL EFFORT

RICHARD S. STROMMEN

The premise upon which this paper is based is this: The program coordinator who conscientiously develops a superb program, who scours the country for the best known and best qualified speakers on the subject, and who consequently presents a program which his associates and colleagues in his field view with admiration *has not done enough*. Regardless of the quality of the program and speakers, he has absolutely no assurance that his constituency will attend to avail themselves of the benefits to themselves and their profession which the program offers. At this point his task has just begun. His efforts must now be channeled toward promotions, increased services, salesmanship, and showmanship which will attract this constituency.

As much as we as program organizers and coordinators would like our programs to stand on their merit, and as much as we dislike our educational effort turning into a "promotion," we must accept the existing situation and fight for the favor of attendance. We must sell and promote, urge, and coerce if we are to succeed. It is well that we recognize the fact that too often we are judged by the records filed following a program where it is quantity (attendance) that is apparent, not quality. It is not necessary that we turn our programs into three-ring circuses, but it is necessary that we realize that salesmanship, showmanship, promotion, and increased services are a necessity in the voluntary adult education offerings.

The purpose of this paper is to outline what we have done at Wisconsin to increase attendance at our extension programs hoping that this will be of some assistance to others in this area of education.

INCREASED SERVICES

- A. **Preregistration** is the first of many details that need attention. Needless to say, total preregistration would immeasurably simplify the task of reservations and arrangements for the program coordinator. I have often stated a registration deadline on the registration form but have never enforced it. Increased attendance statistics have always been too tempting. However, *someday* I shall, and I believe that future Institutes will benefit. All preregistrants are advised of the receipt of their registration and their accommodations are confirmed. In addition, a separate mailing follows which includes a map of the campus which shows the location of all events of the Institute, parking facilities, etc. The registrant reaches the campus knowing that all arrangements have been made for him.

- B. **Registration** is simplified to the point where the preregistrant merely mentions his name and he is handed his portfolio containing all meal tickets, program, name badge, etc. No one likes to stand in line, to be categorized as a member of the "masses." He likes special, individual treatment—and he gets it at Wisconsin. The registration desk is manned throughout the Institute and personnel are available to run his errands and to fulfill any and every need. At one Institute, which was completely by preregistration, a directory was mailed every registrant two weeks prior to the Institute. It listed the registrants alphabetically, their roommates, the hotel, and the rooms to which they had been assigned. Upon a registrant's arrival he had merely to mention his name and he was given the key to his room. Upon arrival in his room he found on his dresser all of the material necessary for the Institute; a plastic portfolio imprinted with the title of the Institute, a program, another directory, name badge, etc. At the conclusion, he had only to leave his key at the desk.
- C. **Housing** is provided in the University dormitories. Off-campus housing is also available and reservations are made upon request.
- D. **Transportation** of any distance is provided by special buses. An on-campus bus service is also available.
- E. **Extra Services** are limited only by the imagination. Our policy of service, service, and more service has eliminated the word *no* from our vocabulary when we have a request from one of our pharmacists. Several examples of these "extra" services are as follows:
 - 1) Transportation was a problem at one Institute. Charter aircraft were hired to alleviate this situation;
 - 2) At another, when wives and children were in attendance, a recreational program and a baby-sitting service were provided;
 - 3) At another, when the program was scheduled mornings and evenings with afternoons free, guides were engaged, and fishing parties arranged, a golf tournament initiated, shooting and tennis matches arranged. Bowling and bridge tournaments were organized in the event rain prevented outside activities;
 - 4) Ladies' programs are arranged when wives are to accompany their husbands—tours, teas, style shows, card parties, etc.

Service Mindedness and Meticulous

Attention to All Details is a Prime Requisite for any Program

5) A speaker requirement list, listing any possible equipment a speaker may need, has been compiled and is mailed every speaker at least a month before a program. The equipment he requests is available and *ready* for use when he stands to make his presentation. It is inexcusable to have a projector with a burned out bulb or with an extension cord too short to reach the nearest outlet or a blackboard without chalk, etc.

EXPANDED PROMOTION

Events associated with an Institute have proven very effective in increasing attendance. If the Institute is on-campus, we look around to see what is scheduled at that time and often a "tie-in" is easily arranged. For example:

1. Arrangements were made to hold the dedication of the 1890 Drug Store of the State Historical Society during one Institute. In addition to all

other promotional efforts for this Institute, a formal invitation was sent to every Wisconsin pharmacist inviting him to this dedication.

A Student Counseling Program was also held in conjunction with the Institute. In this manner an appeal was created for

1. Pharmacists interested in pharmacy management, 2. those interested in the history of pharmacy, and 3. those assuming an obligation in pharmacy recruitment. The Institute was the beneficiary and at the same time recruitment was aided and the State Historical Society was elated at the support it received.
2. This fall the Historical Society will have the originals of the Parke-Davis paintings. A reception and showing will be held during this Institute.
3. Another Institute was scheduled for homecoming week-end and football tickets made available. Since the "best" tickets were to go to the first registrants, earlier registration was encouraged.
4. On the evening preceding one Institute four class reunions were "called," with the co-sponsorship of the University of Wisconsin Pharmacy School Alumni Association. The five, ten, twenty, and twenty-five year classes were chosen and a reunion chairman obtained. All promotional mailings were made through the Extension office. This was so successful that nine class reunions will be held this year the evening preceding the Institute.
5. Presentations have also been made a part of every Institute. University citations are presented at one Institute and the perpetuating scholarships and awards presentations are made at another.
6. An open house and tours of the research and teaching facilities are held the day preceding another Institute.
7. A Hospital Pharmacist Institute will be held in conjunction with this fall's Institute, and hospital pharmacists are encouraged to attend as much of the entire Institute as possible.
8. A dinner-dance is held the second evening of the fall Institute.
9. The dedication of the new offices of the Wisconsin Pharmaceutical Association will be a part of the next Institute.

In general, diversity has been a valuable tool in creating greater interest and attendance.

Using this year's November Institute as an example, we can approximate an attendance of approximately 200 at the class reunions and School of Pharmacy Open House on the day preceding the Institute. Since the homecoming football game is on Saturday many of these people will stay through the Institute. The Hospital Pharmacy Institute, beginning on Friday, will swell the attendance, as many hospital pharmacists will attend the entire Institute. The dinner-dance on Friday night is another welcome diversion. Many of those interested in the W.Ph.A. offices' dedication will come early for the Institute. Others will attend to be eligible for the football tickets—in shortage with a potentially championship team. The reception and showing of the Parke-Davis paintings is another added inducement. Associative events are an important part of any Institute.

PUBLICITY

Publicity, its proper use and timing, is the most valuable tool in our promotional effort. Publicity tells and retells our story. A northern Wisconsin pharmacist tells the story that took place during World War II. He had ordered

six bed pans and by error received six dozen. Since the ordering error was his and the freight bill high he decided to keep them. He filled his entire pharmacy display window with these pans and sold more of them in one month than he had ever sold in a year previously.

Copious publicity does the same for our educational programs. By "displaying" our story often we will also sell in greater quantity (attendance).

Timing is of the utmost importance. A publicity schedule has proven of great value. Let us first consider direct mail to pharmacists. Three monthly mailings, beginning in July (for a November Institute), are made to three separate mailing lists: 1) reunioning alumni, 2) every pharmacist who has ever attended an Institute, and 3) hospital pharmacists. Each mailing is "personalized" with copy slanted toward the desires and interests of that particular group of pharmacists. "First choice" of all accommodations and football tickets is the appeal in the first letter. Publicity at *local* level is the final appeal. With the greatest concentration of effort devoted to these three groups—who are easiest to "sell" on the basis of the program and associative events—the bulk of the final registration is composed of these pharmacists. The majority of our time and effort is devoted to these 750 pharmacists rather than the total pharmacist population of 2,500.

Early in September the first mailing is made to all Wisconsin pharmacists, followed by a second two weeks later. In addition to direct mail promotion:

1. *The Monthly Bulletin of Extension Services in Pharmacy* announces the event and features various aspects of the program and associative events beginning with the July issue.
2. Publicity to National Pharmaceutical Publications begins in August and at least one release per week is mailed through September.
3. *The Wisconsin Druggist*, publication of the Wisconsin Pharmaceutical Association, has been extremely generous and has given us almost unlimited space at all times. Monthly articles are run beginning in July and through September.
4. Beginning in September the state local and daily newspapers are given weekly releases on all phases of the Institute program with special releases on all nationally prominent speakers.
5. Every registrant is given two releases, to which he adds his name and pharmacy. One is released the week prior to the Institute and the other the week following the Institute.
6. Every registrant is given as many "physician letters" as he requests which are mailed to his local physicians informing them that "Pharmacist Jones has just returned from 'School' at the University of Wisconsin and is now better able than ever to serve the health needs of his community, and the allied health professions." Here perhaps is the best example of the title of my paper, *Education by Coercion*: the "social pressure" imposed by the citizenry who expect their pharmacist to be up-to-date (through publicity in the local newspaper) and the "professional pressure" imposed by members of the allied health professions who expect professional proficiency (through the "physician letter" and local publicity). Especially in small- and medium-sized communities, the pharmacist who doesn't attend is made conspicuous.

7. The drug wholesalers are also a valuable ally in the promotion of any Institute. A promotional page is given every Wisconsin drug wholesaler representative and is inserted into his catalogue of current "deals." As he is selling the pharmacist merchandise, he also "sells" the Institute. One drug wholesaler gives us a full page in his bi-monthly buy guide for two or three issues. Another has donated his booth at the W.Ph.A. Convention to us, giving us the opportunity of selling through display not only the Institute, but all of our available services. Hand stamps are also provided and every invoice leaving this office is stamped with the title and date of the Institute. The drug wholesalers realize that through better pharmacy they will also profit and have at all times rendered their complete cooperation. The medical service representative is in the same position of benefiting from better pharmacy, and I am certain he would cooperate.

Proceedings of Institutes are published in the *Monthly Bulletin of Extension Services in Pharmacy* in sections. Each monthly issue features a phase of the preceding Institute. The associative features (1. Hospital Pharmacy Page, 2. Pharmacists' Photo Page, 3. Message of the Month from the School of Pharmacy) of this bulletin have created greater readership and interest.

The results of this promotional program have been gratifying. One is the out-state program which serviced two areas of the state in 1957, serviced seven in 1958, and will serve ten to eleven in 1959—by request. The Institute phase of our program has also benefited. The 1958 November Institute, for example, experienced a 172 per cent increase in attendance over 1957.

To summarize: if the program organizer and coordinator will give meticulous attention to organization details, and develop, if he does not already have, a sincere desire to serve the needs, desires, and whims of his constituency and will accept the fact that promotion, salesmanship, and showmanship do have their place in the voluntary adult education program, he will also attract more and more pharmacists to his programs.

Where the professional requirement does not exceed two years, this plan has the additional advantage of permitting the student to attend a junior or community college in his own town. Informed opinion indicates that if the hundreds of thousands who will seek post high school education in the coming years are to be served, they must attend these local institutions.

Earl J. McGrath, *Am. J. Pharm. Ed.*, 13, 132 (1949)

TOPICS PRACTICING PHARMACISTS PREFER ON REFRESHER PROGRAMS

C. LEE HUYCK

The first recorded conferences or refreshers open to all retail pharmacists of an area were given twenty-nine years ago in 1931 when the New York Pharmaceutical Conference (1) was held at the Hotel Commodore in New York City and the Indiana Druggists Business Conference (2) was held at Purdue University at Lafayette, Indiana. The purpose of the New York Pharmaceutical Conference was to raise \$50,000.00 for the relief of the unemployed needy pharmacists of the city. Fifteen hundred practicing pharmacists attended the banquet and \$7,000.00 was raised. The object of the Indiana Druggists Business Conference was to get the advice of experts in the field of business administration on ways and means of increasing business and profits. The latter was very successful and continued annually as the Purdue Business Conference. (3)

The New York Pharmaceutical Conference recorded another successful meeting in 1933 (4) when 2,500 independent retail pharmacists of the New York City area heard former congressman F. H. LaGuardia recommend enactment of legislation to prohibit the sale of all medicinal items by people other than registered pharmacists and to limit the number of pharmaceutical outlets in New York State according to population.

The next recorded progress under the heading of institute, conference, continuation study, extension, in-service program, seminar, or refresher in the attempt to keep practicing pharmacists informed was a meeting at Omaha on April 23, 1947. (5) The object of the meeting was to inaugurate the A.Ph.A. plan of continuation study. This meeting was held the day after the annual District No. 5 meeting of boards and colleges of pharmacy on the recommendation of past president Moulton of the A.Ph.A. President Serles presided over the meeting which began with a word picture of the present status of pharmacy and its relation to public health and welfare. This was followed by a discussion of the progress of pharmacy which included the newer therapeutic procedures involving the use of drugs. An inspirational address was given at the luncheon meeting, and this was followed by a session devoted to prescription problems. The balance of the day was devoted to answering questions from the floor. It was hoped that these A.Ph.A. continuation study meetings would follow each district meeting of the boards and colleges of pharmacy.

In 1949 the chairman of the committee (6) on activities for the alumni of the AACP listed all the available refresher programs with the hope that the information would help the people undertaking the planning of such programs at the various colleges.

A report of Subcommittee on Extension Education of the AACP in 1955 (7) revealed there was no chance of getting government money for extension training of pharmacists under the George-Deen Act of 1936 since the act stipulated that funds were *only* available to people who are not college graduates.

The Committee on Continuation Studies of the AACP (8) suggested that all those interested in this subject might get together at the next annual meeting of the AACP for an exchange of ideas. On the basis of the chairman's own experience each college should base its program on its own particular needs, i.e., on what the majority of pharmacists in the area want and not on what the faculty of the college think would be good for them. Fees for these programs should be sufficient to take care of the expenses of the refresher. In this regard, it might be well to enlist the aid of the pharmaceutical organizations of the community. Also, administrators of colleges and universities of which the college of pharmacy is a part should be informed that in-service training of practicing pharmacists in a particular area is the responsibility of each college of pharmacy.

The Continuation Committee of the AACP in 1957 (9) reported that the over-all objective in continuation studies is to upgrade the profession. Since pharmacists are a heterogeneous group as to educational background, review courses are essential to bring their basic professional education up to the level of the recent graduate. Through the joint efforts of the faculty and the pharmacists' committee, topics are designated and speakers are selected. This method will bring about better understanding between the practicing pharmacists of the community and the college. The college should underwrite the expenses of the program and obtain as much help as it can from the state and local associations so that this help plus the registration fee will take care of the expenses involved. A comprehensive study of continuation study for pharmacists was recommended to the Executive Committee of the AACP and it was suggested that its cost would be underwritten by an outside source such as the Foundation. The objectives of this study would be to furnish the college of pharmacy with assistance in developing its own continuation program.

Zupko (10) made the following observations relative to refresher programs: (a) In light of the continuous advances in medicine and pharmacy an annual refresher program in each locality is a "must," (b) a college of pharmacy without a refresher program shows lack of interest in the profession, (c) a refresher renews the interest of the college of pharmacy graduates in the college, (d) in general the graduate who returns to the college is favorably impressed in what he has learned and believes his time and money have been well spent, and (e) the refresher offers an unusual opportunity for liaison between pharmacy and the allied health professions. The Committee on Curriculum of the AACP suggested that consideration be given to the collection and publication of institute, seminar, and refresher programs of the various colleges in a separate section of the *American Journal of Pharmaceutical Education*, but unfortunately ways and means of implementing this suggestion were not found.*

The 1958 report of the Committee on Continuation Studies of the AACP (11) noted that not many of the colleges of pharmacy have followed the suggestions of the Pharmaceutical Survey in providing continuing education for the practicing pharmacist. Continuing education is not dependent on any one group, but is the responsibility of every facet of pharmacy. A joint meeting on this subject with the state association secretaries and the state boards of pharmacy would be in order. Again, the committee recommended that a comprehensive

* Editor's Note. The AACP Executive Committee at its Interim Meeting, 1959, assigned the responsibility of collecting and preparing such a compilation for the *Journal* to the chairman of the Committee on Continuing Education.

study of this problem be made which would be supported by some foundation interested in this problem. As for information on the various foundations the guide book, *American Foundations and Their Fields*, by Wilmer Shields Rich** was recommended.

Two questionnaires were addressed to the Alumni of the St. Louis College of Pharmacy. The first was sent December 3, 1957, and the pharmacist was asked to check the topics he thought important enough to put on the refresher program. The topics were as follows:

Products Which Can Be Manufactured in Hospitals,
Prescription Department Inventory Control,
The Oral Codeine Law,
The Pros and Cons of Self Service,
Isotonic Buffered Ophthalmic Solutions,
Uniform Prescription Pricing,
Cooperating with the Dentist,
The Essential Veterinary Drugs and What They Do,
What the Pharmacist Should Know About Antibiotics, and
The Poison Control Center.

In addition, there were two lines on the return post card devoted to "Your Suggestion," followed by the question, "Could You Attend a Three-Day Session in 1959?"

Results of the survey are given in Table I.

TABLE I. PREFERRED TOPICS IN ORDER OF IMPORTANCE FROM 284 REPLIES.

Topic	Number Checked
Uniform Prescription Pricing	193
Prescription Department Inventory Control	169
What the Pharmacist Should Know About Antibiotics	144
The Oral Codeine Law	137
Poison Control Center	102
Pros and Cons of Self-Service	84
Isotonic Buffered Ophthalmic Solutions	73
Cooperating with the Dentist	64
Essential Veterinary Drugs and What They Do	51
Products which Can Be Manufactured in Hospitals	43

Our one-day program carries conveniently six topics so naturally we chose speakers to take care of the first six topics. As members of the faculty, we thought the topic "Cooperating with the Dentist" would be very popular, and if this survey had not been made we would certainly have placed this topic on our program. Here is an example of following the general rule of giving the practicing pharmacist what he wants rather than giving him what we as faculty think he should have.

** American Foundation Information Service, Raymond Rich Associates, 860 Broadway, New York, N.Y.

Under "Your Suggestion" results are given in Table II.

TABLE II. SUGGESTIONS FROM 284 PRACTICING PHARMACISTS AS TO WHAT SHOULD BE ON THE REFRESHER PROGRAM IN ADDITION TO WHAT WAS SUGGESTED.

Topic	Number Desiring Topic
Economics of the Drugstore	11
Professional Relations	7
How New Drugs Act	7
Merchandising Methods	5
Ethics	3
Radioactive Isotopes	3
Tranquillizers	3
Employer-Employee Relations	2
Managing a Soda Fountain	2
Manufacturing Pharmacy	2
Drugstore Layout	2
Return Goods	2
Internship	2
Advertising	2
Public Relations	2
Advantages of Belonging to Pharmaceutical Groups	2
Product Information	2
Narcotic Laws	2
Substitution, Ointment Bases, pH, Five Year Program, Insecticides, Suspending Agents, Refills, Raising the Standards of Pharmacy, Hospital Pharmacy, Legend Drugs, Bookkeeping, Desirability of a Banquet	each 1

Forty-nine per cent of the replies were in favor of a three-day session in 1959. Because the simple majority wanted a one-day refresher, we will probably stay on the one-day program.

At the close of this refresher we circulated a questionnaire to be filled out entitled "Refresher Course for Next Year." The questionnaire and results are as follows:

Refresher Course for Next Year

On the basis of 118 returns the following results were obtained:

- Would you like to have a refresher

Fall	(11%)	Winter	(9.9%)
Spring	(78.7%)	Summer	(0.4%)
- Would you like to have a refresher

1 day	(48.2%)	2 days	(3.58%)
3 days	(8.68%)	5 nights	(19.54%)
- Would you be interested in

Fundamental Principles and Recent Advances one night a week for ten weeks

Yes (48.2%)	No (51.8%)
-------------	------------

If your answer is yes, what subject do you prefer?

Economics 8.8%, Merchandising 3.5%, Dispensing 0, New Drugs 5.2%, Pharmacology 82.5%, Other 0.

4. Check 6 subjects you prefer next year from the following list:

Operation of a Successful Pharmacy	(47.4%),
Practical Experience	(16.1%),
Employee Training	(37.3%),
Store Layout and Fixtures	(40.6%),
Relations with the Doctor	(60%),
Self-Service	(26.3%),
Recent Advances in Germicides	(23%),
What the Five Year Course will do	(31.4%),
Promoting Dental Prescriptions	(23%),
Animal Health	(11.8%),
Prescription Dept. Inventory Control	(56.8%),
Dispensing Problems	(39%),
Pharmacology and Use of New Drugs	(56.8%),
The Hospital Pharmacy Formulary	(23%),
Recent Dermatological Prescriptions	(21.2%),
Radioactive Pharmaceuticals and their use	(39%) and
Fair Trade	(20%).
"Your suggestion" in order of total votes were: Ethics, Merchandising, and Professional Fees.	

Table III shows that the following six topics were the most popular:

TABLE III. PREFERRED TOPICS IN ORDER OF IMPORTANCE FROM 118 REPLIES.

Name	%
Relations with the Doctor	60
Pharmacology and Use of New Drugs	56.8
Prescription Department Inventory Control	56.8
Operation of a Successful Pharmacy	47.4
Store Layout and Fixtures	40.6
Radioactive Pharmaceuticals and Their Use	39.0
Dispensing Problems	39.0

Abrams (12) of the American College of Apothecaries made a similar survey of the membership to determine what topics should be on its convention program. The results are given in Table IV.

TABLE IV. SUGGESTED TOPICS APPROVED BY THE MEMBERSHIP OF THE AMERICAN COLLEGE OF APOTHECARIES IN ORDER OF IMPORTANCE.

1. Professional Sales Discounts (Physicians-Nurses, etc.)
2. Prescription Pricing
3. Inventory Control
4. Closer Integration of Pharmaceutical Associations
5. Professional Promotion
6. Intraprofessional Relations-Manufacturer Retail Relations
7. Interprofessional Relations
8. Public Relations
9. Clinic-Owned Pharmacies
10. Bookkeeping and Accounting Procedures

This paper points out the problems of the present-day practicing pharmacist. If any conclusion can be drawn from these surveys, it would emphasize the conclusion of the Committee on Continuation Studies of the AACP (8) namely: "Give the practicing pharmacist what he wants and not what the faculty of the college of pharmacy thinks he wants."

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The colleges of pharmacy, both the independent and state controlled, must receive larger support. The business of pharmacy is big business. By and large it is prosperous. The profession of pharmacy, on the other hand, is to be characterized as poverty-stricken. Yet the business cannot continue to progress and be prosperous without the profession. Ways and means must be devised whereby the profession of pharmacy directly benefits from the prosperity of the business of pharmacy.

Edward C. Elliott, *Am. J. Pharm. Ed.*, 12, 717 (1948)

A GRADUATE COURSE IN PHARMACEUTICAL RESEARCH TECHNIQUES AT THE UNIVERSITY OF WISCONSIN

KENNETH A. CONNORS

INTRODUCTION

The graduate level courses offered in schools of pharmacy reflect strongly the research interests of the faculties at these schools. The content of the course labelled, variously, *Instrumental Analysis*, *Research Methods*, etc., can be particularly revealing of the nature of the interests of the faculty, and will be especially influenced by the background of the course instructor. This account of the approach used at the University of Wisconsin is presented, therefore, not because it is supposed that anyone else may wish to teach an identical course, but rather as a source of suggestions from which a teacher may want to choose some segments to fit his own program.

The course at this school consists of both lecture and laboratory components; it is a one-semester course. Two lectures per week and two three-hour laboratory periods suffice to treat the material. A proper background includes one year each of calculus and physical chemistry. The purpose of the course is to introduce the beginning research student to some of the experimental techniques, on both the theoretical and practical levels, which have been found to be most useful in the study of systems and problems which he is likely to encounter. It is in the choice of these techniques that the individual research characters of the instructor and the school are revealed. The lecture material includes more methods than the students actually work with in the laboratory. Both *instrumental* and *noninstrumental* methods (the differentiation depends upon one's definition of *instrument*) are considered.

LECTURE

A detailed outline of the lecture course taught in 1957 is given below, followed by discussion of some of its aspects. (The laboratory section of the course is presented in the next sub-section.)

Phase Solubility Analysis

I. Method

II. Interpretation and Uses

A. Pure Substance

B. Multicomponent Mixture

C. Two Components in Ratio of their Solubilities

D. Isolation of Pure Substance from Mixture

III. Experimental

Absorption Spectroscopy

I. The Nature of Radiation

A. The Electromagnetic Spectrum

B. The Quantization of Energy

II. The Origin of Absorption Spectra

- A. Components of Molecular Energy
- B. Quantum Requirements for Energy Absorption
- C. Types of Spectra
 - 1. Rotational (Far Infrared)
 - 2. Vibrational-Rotational (Infrared)
 - 3. Electronic (Visible and Ultraviolet)

III. Qualitative Applications of Spectra

- A. Nomenclature
- B. Electronic Spectra
 - 1. Resonance
 - a. Concept of Resonance
 - b. Resonance and Spectra
 - 2. Spectra and Molecular Structure
 - a. Chromophores and Auxochromes
 - b. Group Assignments and Spectral Behavior
- C. Vibrational-Rotational Spectra

IV. Quantitative Applications of Spectra

- A. Beer's Law
 - 1. Derivation, Nomenclature and Presentation of Data
 - 2. Single Component Analysis
 - 3. Multicomponent Analysis
 - 4. Chemical Deviations from Beer's Law
- B. Studies of Ionic Equilibria
 - 1. Determination of Equilibrium Constants
 - 2. Photometric Titrations
- C. Molecular Weight Determinations
- D. Studies of Complexes in Solution
 - 1. Mole Ratio Method
 - 2. Method of Continuous Variations

V. Determination of Absorption Spectra

- A. Instrumentation
 - 1. Beckman Model DU Spectrophotometer
 - 2. Cary Model 11 Spectrophotometer
 - 3. Bausch and Lomb Spectronic 20 Colorimeter
 - 4. Infrared Spectrophotometers
- B. Instrumental Deviations from Beer's Law
 - 1. Effect of Finite Band Width
 - 2. Effect of Stray Radiation
 - 3. Other Effects: Hysteresis, Multiple Reflections

Electroanalytical Chemistry**I. Introduction**

- A. Ohm's Law
- B. Faraday's Law

II. Conductometry

- A. Electrolytic Conductance
- B. Determination of Dissociation Constants
- C. Conductometric Titrations
- D. Measurement of Conductance
 - 1. Conductivity Cells
 - 2. The Wheatstone Bridge

III. Polarography (Voltammetry)

- A. Current-Voltage Curves
 - 1. Concentration Polarization
 - 2. Current-Voltage Curves
 - 3. The Dropping Mercury Electrode (DME)
- B. The Diffusion Current
 - 1. The Diffusion Process
 - 2. The Ilkovic Equation
 - 3. Polarographic Maxima
- C. The Half-Wave Potential
 - 1. Equation of the Wave
 - 2. Properties of the $E_{1/2}$
 - 3. Reversibility
 - 4. Overvoltage
- D. Analytical Applications
- E. Instrumentation

IV. Amperometry (Voltammetry at Constant Voltage)

- A. Amperometric Titrations
- B. Instrumentation

V. Potentiometry (Voltammetry at Zero Current)

- A. Some Thermodynamic Concepts
 - 1. Energy
 - 2. Entropy
 - 3. Free Energy
 - 4. Activity and Activity Coefficient
 - 5. Free Energy and the Equilibrium Constant
- B. Galvanic Cells
 - 1. Electrodes and Cells
 - a. Reversible Cells
 - b. Types of Electrodes
 - c. Schematic Representation of Cells
 - 2. Electromotive Force of Galvanic Cells
 - a. The Liquid Junction Potential
 - b. Electromotive Force and Free Energy
 - c. Electromotive Force and the Equilibrium Constant
 - d. The Nernst Equation
 - e. Standard Electrode Potentials
 - f. Electrochemical Conventions
 - g. Electromotive Force Calculations
 - 3. pH and Electromotive Force

- C. Potentiometric Titrations
 - 1. Acid-Base Titrations
 - a. Determination of the End Point
 - b. Determination of Dissociation Constants
 - 2. Precipitation Titrations
 - 3. Oxidation-Reduction Titrations
- D. Instrumentation

VI. Coulometry

- A. Electrolysis and Current Efficiency
- B. Controlled Potential Coulometric Analysis
- C. Coulometric Titration with Constant Current
- D. Coulometers

Chromatographic Separations

I. Principles of Chromatographic Methods

- A. Chromatographic Systems
 - 1. Adsorption Chromatography
 - 2. Partition Chromatography
 - 3. Ion Exchange
- B. Procedures for Conducting the Separation
 - 1. Elution Analysis
 - 2. Frontal Analysis
 - 3. Displacement Analysis
- C. Methods for Following the Progress of the Separation

II. Theory of Chromatographic Separation

- A. Solute-Solid Adsorption
 - 1. Adsorption Isotherms
 - 2. Effect of Isotherm on Shape of Zone
- B. Liquid-Liquid Distribution
 - 1. The Distribution (Partition) Coefficient
 - 2. Distribution Isotherms
- C. Effect of Molecular Structure on Separation
 - 1. Physical Forces of Molecular Interaction
 - 2. Definitions of R and R_f
 - 3. Relation of R and R_f to Distribution Coefficient and Molecular Structure

III. Practical Chromatography

- A. Column Partition Chromatography
- B. Paper Partition Chromatography
- C. Adsorption Chromatography
- D. Ion Exchange

The Karl Fischer Titration

I. Karl Fischer Reagent

- A. Composition
- B. Reaction with Water
- C. Variation in Composition
- D. Standardization

II. End Point Detection

- A. Visual Method
- B. Photometric Method
- C. Electrometric Methods

III. Applications**Expression of Experimental Results****I. Measurement of Accuracy. The Mean****II. Measurement of Precision**

- A. Mean Deviation
- B. Standard Deviation

III. Rejection of Results

The lectures were presented in the above order, which is not entirely arbitrary. It is evident that a student should not be sent to the laboratory to perform an experiment which he does not understand in principle, and usually the best way to impart this understanding is through the lecture course. If the lecture and laboratory series are taught concurrently it is impossible to discuss every technique in lecture before the student must use it in the laboratory. For this reason the noninstrumental techniques were assigned first in the laboratory, since an understanding of these is readily obtained from the literature, which is not the case with the instrumental methods. The instrumental methods were therefore discussed first. The exception, phase solubility analysis, was given in the first lecture because the experiment could be performed by only two students simultaneously due to shortage of water bath space, and so extended throughout the semester. The short presentation of simple analytical statistics was added only after the students' written laboratory reports indicated this need.

Although a polarographic experiment was not performed in the laboratory, the principles of the method were treated in some detail because comprehension of the more common electrometric techniques follows easily upon such a background. Amperometric titration, for example, becomes an especially simple case of voltammetry. With the use of idealized polarograms of the solutions at different points in the determination, the principles of potentiometric and coulometric titrations are more easily seen.

The discussion of chemical thermodynamics is very compressed and is considered to be a review of the subject as treated in the basic physical chemistry course. Its inclusion seems necessary to ensure a common background suitable for the derivation of the Nernst equation. The determination of dissociation constants by measurements of conductance or electromotive force is not subjected to rigorous thermodynamic treatment, but is confined to the practical level; the approximations are pointed out.

In most presentations of Beer's law the initial formulation is offered as a matter of experimental fact; that is, the decrease in light power of a beam of monochromatic radiation is stated to be directly proportional to the power of the incident beam and to the number of absorbing units in the beam path. An interesting theoretical development of the law is based upon simple quantum principles of radiation. (1) My presentation of this derivation simplifies it in appearance by reducing the number of absorbing unit types to one (equivalent to a solution of a single absorbing solute) so that the resulting equation is identical with that usually encountered. This theoretical justification of the absorption

equation probably aids the student's understanding, since he has already met the law in the experimental context in his physical chemistry course.

Students are provided with mimeographed material which supplements the lectures. This material consists of: literature references to books and journal articles concerning absorption spectroscopy, electroanalytical chemistry, and chromatography; the detailed outline presented above, which helps the student to arrange his notes and his thoughts; problem sets in spectroscopy and electrochemistry; and suggested spectroscopic nomenclature. (2) In 1957 each student was supplied with a copy of Fritz's booklet on nonaqueous titrations. (3) Among the textbooks which have been suggested reading in this course are those by Ewing (4), Delahay (5), and Willard, Merritt, and Dean. (6)

Evidently many more topics are suitable for treatment in this type of course. Of particular interest to research pharmacists are such subjects as surface chemistry, molecular complex formation, and rheology. At this school these topics are discussed in other graduate courses.

LABORATORY

A well-designed laboratory experiment, at any level of instruction, must meet two requirements: (a) it must illustrate clearly the capabilities of the technique which have been selected as pertinent; (b) it must yield reasonably satisfactory results when performed by students. The first requirement is obvious, though not always simple. The second is sometimes overlooked. Manipulative ability and confidence are dependent upon success for their development; the laboratory experiment must "work" if it is to serve its purpose.

Each of the experiments in the research techniques course at the University of Wisconsin has been found to exhibit a satisfactory degree of success in the hands of students. The experiments have been formulated to provide an introduction to the applicabilities of the most frequently used techniques and instruments; they also require sufficient repetition of the experimental manipulations to develop some familiarity with the instruments.

The experiments presently used in this course will be described briefly and some of the more interesting sections will be given in detail. These experiments are occasionally altered to meet the requirements of instrument availability and current research interests. Other topics can be suggested as the basis of interesting and useful exercises. Among these are: rheological properties of fluids; the formation of molecular complexes; surface and interfacial phenomena; the kinetics of chemical reactions; infrared spectroscopy; and photomicrography.

Partition Chromatography. The separation of acetophenetidin and caffeine on a silicic acid column (7) has been used as a laboratory experiment. Quantitative separation and recoveries are often achieved with the student's first attempt. Because practice in packing partition chromatographic columns results in marked improvement in their quality and, hence, performance, it is good for the student to pack several. This particular separation is convenient because it is rapid and can be done in multiplicate. A fast flow rate (about 10 ml./five minutes) is desirable. The eluate is collected in 10 ml. fractions which are transferred to aluminum weighing pans and evaporated to dryness; the solute is determined gravimetrically. This method of analysis is sufficiently sensitive when 20 to 30 mg. of each component is taken in the sample, and it is very simple and general.

The usual basis of chromatographic separation is in the polarity differences of the molecules to be separated; these differences are responsible for variations in degree of solute interaction with the internal and external phases, and so for the eventual separation. This principle is perhaps best illustrated by separation of the individuals in a homologous series. A laboratory experiment has been based upon the separation of sebacic, azelaic, suberic, pimelic, and adipic acids by elution with butanol-chloroform eluate of increasing butanol content (8). The eluate is analyzed by titration with standard base.

The Karl Fischer Titration. The determination of water by titration with the Karl Fischer reagent is a very simple technique (9); its inclusion in the laboratory course is justified by the general lack of understanding of the method among beginning research students. Visual detection of the end point is used exclusively. A commercial reagent (Fisher Scientific Co.) is most convenient; the reagent sold by at least one supplier contains a red dye, which of course renders it useless if a visual titration is to be performed.

The reagent, contained in an automatic buret with one liter capacity reservoir, is standardized by each student. Weighed samples of water in methanol solution is the standard; the titrations are performed in small volumetric flasks to limit contamination by atmospheric moisture. Students are required to determine the water content of an "unknown" sample and also to find the number of molecules of water in a hydrated salt.

Purity Determination by Phase Solubility Analysis. Analysis of a mixture of aminoacetic acid and DL-alanine illustrates the power of the solubility analysis method. A known mixture is accurately prepared to contain about 90 per cent aminoacetic acid and 10 per cent alanine. Samples of this mixture are accurately weighed into 10 15 ml. glass vials in the approximate amounts of 200 mg., 250 mg., 300 mg., . . . 650 mg. Into each vial 10 ml. of 50 per cent ethanol-water is pipetted, and the vials are covered and placed in a constant temperature water bath at 30° and rotated to ensure attainment of equilibrium.

After three days the vials are removed. A 5 ml. aliquot is withdrawn from each vial; a bit of cotton wrapped about the pipet tip serves as a filter. The aliquots are transferred to numbered, tared aluminum weighing pans, which are dried to constant weight at 70-80°.

A plot is made of weight of material added per ml. of solvent (X axis) *versus* weight of solute found per ml. of solution (Y axis). From the slope of the second segment of the plot the concentration of aminoacetic acid can be calculated; extrapolation of this segment back to the Y axis yields the solubility of aminoacetic acid. A discussion of this method is given by Mader in *Organic Analysis, Volume 2* (10).

Because the solubilities of aminoacetic acid and DL-alanine are nearly identical in this solvent, a 50-50 mixture of the two would analyze as a pure component.

Analysis by weight is nearly general in the phase solubility technique; only when all components of a mixture respond to the analysis is another method possible.

Amperometric Titration. Silver nitrate is a convenient reagent in amperometric titration because when the saturated calomel electrode serves as the reference electrode an external emf need not be applied to effect reduction of silver ion. The indicator is a rotating platinum electrode driven by a variable speed

cone drive motor. The SCE is prepared in one arm of an H-cell and makes electrical connection with the titration cell by means of a potassium nitrate salt bridge (11). With this apparatus titration of chloride and bromide ion, separately or in mixture, can be made (12).

Conductometric Titration. A Leeds and Northrup conductance bridge with a dip-type conductivity cell constitutes the apparatus for this experiment. The several types of acid-base titration are illustrated by titration of a strong acid with a strong base, determination of a mixture of acids (hydrochloric and acetic), titration of a weak acid (boric acid) with a strong base, and of a weak base (pyridine) with a strong acid.

In this experiment, as in all methods which employ instruments, the student standardizes his reagents by conventional means, usually visual indicator titration. An independently determined titer provides a firm foundation from which he can approach the instrumental method with confidence in his reagents.

Potentiometric Titration. Most of the standard solutions in this experiment are used in other experiments also. 0.1 N sulfuric acid, 0.1 N sodium hydroxide, 0.25 N acetic acid, 0.1 N silver nitrate, and 0.1 N perchloric acid in acetic acid are needed. Buffer solutions for the standardization of the pH meter are prepared by each student in accordance with these directions: (a) 0.05 M potassium biphthalate. Exactly 1.021 gm. of potassium biphthalate is dissolved in enough water to make 100 ml. of solution. This solution has a pH of 4.01 at 25°. (b) 0.01 M sodium borate. Exactly 0.381 gm. of $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ is dissolved in enough freshly boiled water to make 100 ml. The pH of this solution is 9.18 at 25°.

The pH meter is always standardized with both solutions.

Beckman Model H-2 pH meters are used. Glass, saturated calomel, and silver electrodes are necessary. Titrations are made with a 10 ml. buret. A salt bridge is prepared by gently heating 3 gm. of agar, 20 gm. of potassium nitrate, and 100 ml. of water. This solution is poured into a U-shaped piece of glass tubing; air bubbles must not be introduced. This bridge may be kept for some time if the ends are immersed in saturated potassium nitrate solution.

Determination of an Acid Dissociation Constant. Three ml. of 0.25 N acetic acid is pipetted into a 150 ml. beaker, and 50 ml. of water is added. This solution is titrated potentiometrically with 0.1 N sodium hydroxide, using a SCE-glass electrode system and a pH meter standardized with the standard buffer solutions; increments of 0.1 ml. are added in the vicinity of the end point. Values of pH are plotted against volume of titrant and the end point is determined. From the pH-volume titration curve the apparent dissociation constant of acetic acid can be read.

Each student is supplied with a sample of an "unknown" weak acid, the dissociation constant of which is listed in the *Handbook of Chemistry and Physics* (13), and is required to determine its equivalent weight and dissociation constant. With these values he may be able to identify the acid.

Titration of a Weak Base. (a) Aqueous System. About 120 mg. of antipyrine is accurately weighed into a beaker and dissolved in 50 ml. of water. The solution is titrated potentiometrically with 0.1 N sulfuric acid, using the SCE-glass electrode system. (b) Nonaqueous System. About 120 mg. of antipyrine is accurately weighed into a beaker and 50 ml. of glacial acetic acid is added. The solution is titrated with 0.1 N perchloric acid in acetic acid, using a SCE-glass

combination. Emf values are recorded instead of pH. For greater stability in the acetic acid system the potassium chloride solution in a saturated calomel electrode may be replaced with 0.02 M lithium chloride in acetic acid.

This experiment illustrates strikingly the enhancement of basic properties in an acidic solvent.

Argentimetric Titration. About 175 mg. of phenobarbital is accurately weighed into a beaker; fifty ml. of 3 per cent sodium carbonate solution is added to dissolve the sample. Fifty ml. of 50 per cent acetone-water is added to repress dissociation of the silver phenobarbital formed during the titration. The sample is titrated potentiometrically with 0.1 N silver nitrate, values of emf being recorded. A silver electrode is immersed in the titration solution and a saturated calomel reference electrode is immersed in a separate saturated solution of potassium chloride, which is connected electrically to the titration vessel by means of the salt bridge.

Spectrophotometry. The Beckman Model DU. The ultraviolet absorption spectra of sulfathiazole and sulfanilamide are scanned between 220 m μ . and 350 m μ . Increments of ten m μ . are taken at flat portions of the curves, 5 m μ . on the side of an absorption band, and 2 m μ . in the region of a minimum or maximum. The data are plotted on linear paper, absorbance being graphed as the ordinate and wavelength as the abscissa.

In order to put these spectra on an equivalent basis, each reading of absorbance is converted to the corresponding molar absorptivity with Beer's law, $A = abc$, where A is the absorbance, a the molar absorptivity, b the path length (usually one centimeter), and c the concentration in moles/liter. The values of molar absorptivity are plotted *versus* wavelength, the spectra of the two compounds being superimposed on the same graph. From an examination of this graph two wavelengths may be chosen which will be suitable for analysis of a mixture of the two compounds.

Five solutions of sulfathiazole in the concentration range two-ten mg./liter, in 95 per cent ethanol, are prepared and the absorbances at the two selected wavelengths determined. Beer's law plots are made and the absorptivities calculated. This procedure is repeated with sulfanilamide.

A solution containing one of the compounds is given to the student. By scanning its spectrum he is able to identify the compound and then perform a quantitative analysis. Another solution containing both substances is analyzed quantitatively using a pair of simultaneous equations and the absorptivity values determined earlier. (14)

Spectrophotometry. The Bausch and Lomb Spectronic 20. The USP colorimetric maltol assay for streptomycin is the basis for this experiment. A standard curve is prepared which brackets the value of the unknown sample; the unknown concentration is read from the curve.

Spectrophotometry. The Cary Model 11.

Solvent Effect on Absorption Spectra. The spectrum of benzene is scanned in the vapor state and in ethanol solution. The student is asked to suggest an explanation for the marked difference in resolution.

Effect of Structural Variation on Spectra. The spectra of benzene, naphthalene, anthracene, and naphthacene are recorded. (The first three are in ethanol, the last in benzene.) The naphthacene spectrum is scanned in the visible region, the others in the ultraviolet. For each compound the wavelengths of

maximum absorption for the three major peaks are tabulated. These wavelengths are plotted against the number of fused rings in the compound. The student should be able to account for the observed change in frequency of absorption of this sequence of compounds. He is asked to estimate the approximate positions of the wavelengths of maximum absorption that might be observed for pentacene.

Determination of an Indicator Equilibrium Constant.(6) 0.1 gm. of bromthymol blue is triturated with 3.2 ml. of 0.05 N sodium hydroxide in a mortar; this mixture is diluted to 200 ml. with water to give a 0.05 per cent stock solution.

About eleven buffer solutions, ranging from pH 5.2 to 9.2 at intervals of 0.4 pH unit, must be available. Two ml. of indicator stock solution is added to 60 ml. of each buffer. Every final solution must contain the same concentration of indicator. The spectra of the solutions are recorded between 425 m μ . and 750 m μ . A graph of absorbance at the band peak *versus* pH is made. From the graph the maximum and minimum values of absorbance attainable with the concentration of indicator used can be determined. The pH at which $A = (A_{\max} + A_{\min})/2$ is equal to the pK of the indicator. This may be read from the graph.

This experiment is similar to the usual method of spectrophotometric determination of dissociation constants (15). It is based upon the relation $pK = pH - \log ([Salt]/[Acid])$. The same procedure can be used to find the constant for an acid or base which absorbs in the ultraviolet and the spectrum of which changes with pH. The visual indicator seems preferable, however, because of the opportunity for instrumental-visual comparison.

Acid-Base Titrations in Nonaqueous Solvents. Bases are titrated in glacial acetic acid with standard perchloric acid. Fritz's booklet gives details for the preparation of the reagent (3). Two indicators have been found to be particularly easy to work with. Quinaldine red changes from pink in the base form (acetate) to colorless in the acid (perchlorate). The color change with *p*-naphtholbenzein is from yellow to green.

Free bases, such as aminopyrine, are titrated directly in acetic acid solution. Amine salts, like thiamine hydrochloride, are first reacted with excess mercuric acetate, then titrated (16).

Weak acids can easily be determined with sodium methoxide solution. The titration solvent is dimethylformamide, ethylenediamine, or pyridine; thymol blue is a satisfactory indicator. The titrant is prepared by dissolving sodium in methanol and is standardized against benzoic acid (3). Sulfonamides and barbiturates are easily titrated.

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It now remains for the members of the pharmaceutical profession to provide proof that pharmacy is not a vanishing profession; but a vanquishing profession concentrating its strength to overcome those who would devalue pharmacy as a health profession.

Edward C. Elliott, *Am. J. Pharm. Ed.*, 12, 721 (1948)

SOME QUANTITATIVE AND QUALITATIVE ASPECTS OF PHYSICAL PHARMACY

BERNARD ECANDOW

An attempt at a complete description of any system in the physical sciences must be stated essentially in mathematical terms. A quantitative description in physical pharmacy must, therefore, be expressed in mathematical language.

With the introduction of physical pharmacy into the undergraduate curriculum, objections have arisen to the *excessive* amount of time that would have to be devoted to developing a proper mathematical background for a quantitative approach. Any mathematical course which is significantly briefer than that given to undergraduate chemistry majors(1), while useful, does not equip a student to understand conclusions arrived at through the usual involved calculations. The conclusions are memorized and perhaps accepted, but they are not understood. They do not develop whatever mental model the student has of the particles interacting in the dosage form. The student cannot correlate the interactions, in his mental model, with the corresponding variable in the mathematical development of the underlying concepts.

The deductive methods of mathematics are applied to data, obtained from experimental work upon dosage forms, to develop the basic concepts. However, for a student, reasoning based on physical and chemical intuition can often illuminate a concept more clearly than a mathematical derivation.

A description of any physical system in terms other than mathematical is considered to be a qualitative description. The danger inherent in a qualitative description is its tendency toward superficiality. However, a qualitative description need not lack either rigorous reasoning nor intellectual content. In this connection it is instructive to consider the teaching philosophy in other subjects.

The study of chemistry involves the study of such concepts as chemical bonding, resonance, molecular orbitals, and reaction mechanisms. These concepts were quantitatively developed through the mathematical theory of quantum mechanics. In the undergraduate courses these topics, all basic to chemistry, are rarely discussed in mathematical terms. Rather, the attempt is made to develop in the student a chemical intuition and a *working* knowledge of the concepts involved. (2) The usefulness of this approach, in more advanced work, is illustrated by the detailed stereochemical picture developed by chemists for each step in a chemical reaction. These newer concepts in reaction mechanism are derived, chiefly, from chemical intuition and experience. (3)

In a similar manner the subject matter of colloidal chemistry, so intimately a part of physical pharmacy, is usefully discussed at textbook length in a "systematic approach to fundamentals covering main concepts" with very little recourse to mathematics.(4)

From the foregoing paragraphs it becomes evident that a qualitative course in physical pharmacy must attain its primary objectives (5) by de-

veloping the student's physical and chemical intuition. Intuition in turn is bound up with the student's mental "model" and his ability to do "thought experiments" with this model. The test of any explanation in this area, whether in qualitative verbal terms or in mathematical terms, is its success in elaborating in greater detail the character of the particles and interactions in the mental mechanistic model. A "lost" feeling occurs when little or nothing in the explanation seems related to this model and thereby to what the student thought was happening.

Any native perception the student may have is developed through experience until a "feel" for the subject is obtained. In the undergraduate years, experience is gained through: classroom and laboratory work where continuous correlation should be made between theory and application; a thorough familiarity with the subject's basic vocabulary; and reading the current literature. From this basis the important concepts can be elucidated and a mental model of the particles and forces involved can be developed.

The first course in physical pharmacy may profitably be taught before the regular course in physical chemistry. An acquaintance with physicochemical concepts in qualitative terms related to familiar materials and examples in pharmacy can pave the way to a more meaningful course in physical chemistry.

For those students who will later require a quantitative knowledge of physical chemistry and physical pharmacy, a qualitative course in physical pharmacy can be a valuable aid in pointing out the basic concepts, which are otherwise too frequently obscured by the mathematical exercises employed. The difference between the mathematical approach and a less quantitative approach is one of degree. The objective in both cases is the illumination of basic concepts.

At the present time it is not possible, for numerous reasons, to teach a completely quantitative course in physical pharmacy. Until teaching such a quantitative course becomes desirable and feasible, for the undergraduate program a qualitative course, properly taught, is a valuable contribution to the transition of pharmacy from an art to a science.

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The profession of pharmacy stands today in need of a stronger unified will to do.

Edward C. Elliott, *Am. J. Pharm. Ed.*, 12, 706 (1948)

PUBLIC HEALTH IN THE PHARMACEUTICAL CURRICULUM

WILLIAM W. STILES AND SHIRLEY COOPER

INTRODUCTION

The subject of public health has been assigned a somewhat ambiguous position in the pharmaceutical curriculum during the past decade. Frequently, it has been treated fragmentarily as an inherent part of other courses. However, public health concepts are becoming more fully appreciated by pharmacists as knowledge vital to their understanding of community health problems. In view of this changing status, it has been considered timely to re-evaluate the needs of pharmacists in preparation for their role as part of the health team. Consequently, a study has been made at the academic level to determine how a single course in public health can best serve the professional needs of pharmacy students.

The study was conducted in the University of California School of Pharmacy, a part of the University of California Medical Center in San Francisco. A five-part non-objective questionnaire was developed and used in interviewing sixteen faculty members, as well as seventy-five pharmacy students enrolled in the two-unit undergraduate public health course. Faculty interviews were of the oral, free-answer type with the interviewer recording. An hour was allowed for each faculty interview. Students were necessarily treated *en masse*. The questionnaire form was distributed so that each student could record his own responses. Possible threatening factors were removed by clearly stating that all replies would be treated anonymously and confidentially. Students were assured that replies would in no way affect their final grades for the course. As anticipated, there were some emotional reactions by the students toward the course. Most student responses were appreciably objective.

A very simple tabulation was made of the responses to each question in order to determine the extent to which the various ideas were distributed. Students' replies were summarized on the basis of these tabulations. Faculty replies were summarized on this same basis to which depth was added by specifically including the tenor of the replies. Since there were only sixteen faculty members interviewed, the probability of significant tabulations on similar ideas was considerably lower than that among the students.

In the final analysis, indications are that faculty and student ideas and attitudes are close in their understanding of the professional pharmacist's role. Faculty views tend to be broader and to show more insight, as might be expected. There appears to be a common acceptance by both groups of professional responsibility in the problems of community health as opposed to individual health. This response was not anticipated.

INTERVIEWS IN SUMMARY

FACULTY INTERVIEWS

Pharmacist's role in the community

Although several of the faculty members are not pharmacists, their close relationship with this professional group has given them insight into the problems related to the professional training program. Consequently, there is no valid separation of faculty responses along the lines of pharmacist vs. nonpharmacist, *per se*.

Faculty opinion supports the idea that the pharmacist's role is an individual concern. This is influenced in part by his orientation to the ideas of public health and community service as well as by the area in which he works. In this study, references were primarily concerned with retail pharmacists. The small minority, which includes manufacturing pharmacists, detail men, hospital pharmacists, teachers, etc., were either specifically or by implication omitted from consideration. Thus, the modern (retail) pharmacist's primary responsibilities lie in the control of drugs through stocking, compounding, and dispensing. His training, however, prepares him to be more than the "storekeeper" with whom he is frequently identified.

The modern pharmacist is an expert consultant on drugs to whom physicians and other medical persons may turn for professional services. He is likewise equipped to serve his public without violating the confidence of the physician-patient relationship. He is in an ideal position to disseminate health information to the public, but should also know when to refer his customers to a physician's care.

The faculty believes that individual discretion in the breadth and degree of community participation should be granted to pharmacists just as it is to other professionals. However, the faculty also believes that pharmacists do have both moral and professional responsibilities to support constructive programs and to participate in these whenever possible. Where health problems of the community are involved, they believe that pharmacists should assume civic responsibilities to a greater degree than the average citizen.

To understand how a single introductory course in public health might best help prepare students for their careers, it is necessary to consider the changes that have been occurring in pharmacy during the past decade and to anticipate the demands and circumstances of the decade ahead. Since the end of World War II, progress in knowledge of drugs and in the improvement of end products has been exceedingly rapid. The consequences are reflected both economically and in the professional status of pharmacists. Newer drugs marketed during the past ten to fifteen years have made the pharmacist less of a technician, more of a professional consultant. Time for this newly extended responsibility has been made possible by presetting and prepackaging, for compounding now takes less of a pharmacist's time.

Another consequence of this new progress has been the expansion of the academic curriculum for pharmacists. Anatomy, microbiology, pathology, and physiology are more prominent in the training program today than ten or fifteen years ago. The total time required in training has moved upward to four or six years. Education is now doing, and will continue to do, much to raise the professional competence and acceptance of pharmacists. The faculty believes that students are more keenly aware of the importance of legislation as it affects

their professional interests. They are also aware of the union efforts to move into several levels of the drug industry in the guise of socialized health programs.

Problems foreseen by the faculty

There are three "problem areas" which the faculty felt must be resolved before individual difficulties might be appreciably reduced. These areas include (a) communications, (b) attitude toward community responsibilities, and (c) public understanding of the high costs of drugs and professional pharmacy fees. The first, communications, is both an intra- and inter-professional problem. Personal relationships within the profession are improving slowly as membership in local professional organizations rises. The faculty believes progress in this area will depend to a great extent upon social indoctrination at the college level.

The term "inter-professional relations" is almost synonymous with "pharmacist-physician relations," but expressed either way, this relationship has admittedly not been as good as it should be. This is a topic not openly discussed—it is too embarrassing for *any* group to air its weaker characteristics publicly. The faculty feels the traditional causes for professional stratification are being reduced, *i.e.*, the educational gap between the groups and the economic dependence of pharmacists upon physicians are both being adjusted to modern needs. Expanded degree programs in pharmacy schools are narrowing the educational gap. Some schools are offering a few courses to mixed professional groups which provide a limited opportunity to develop a common core of understanding and, hopefully, rapport. Some easing of the economic stresses has been observed as physicians become more dependent upon their pharmacists for professional advice on drugs and drug items and as the latter are increasingly able to demonstrate the values of such dependence. It was noted that social ties do much to strengthen relations, that individual friendships do emerge, but that the two groups are segregated even at the college level.

Acceptance of community responsibilities has been neglected by many pharmacists. Most faculty men believe the pharmacist is so completely tied to his store that little time or energy remains for other activities. Apparently, only a few retail pharmacists are motivated to extend their time beyond the store level. It will be the pharmacist's responsibility to take the first step toward becoming involved in community activities. His potential as a professional consultant goes beyond the confines of his store to the various voluntary and official health committees. Initiation of participation in health-oriented programs is more important in large cities and metropolitan areas than in small towns where a closeness persists between the druggist and his customers. The high degree of individual mobility in urban areas creates an impersonal business relationship between a pharmacist and his public. Because of this, deliberate effort is required on his part if he is to be considered a professional person upon whom both the medical and lay groups may rely.

The third problem, that of explaining the high costs of drugs and fees to the public, is essentially one of education. A good public relations program will be needed to overcome the resentment toward costs of pharmacy services.

Public health in the pharmacy curriculum

Among the faculty there is an acknowledged overlap between public health and several of the extended courses in the curriculum, but this is not felt to be detrimental. The general belief is that the public health course enlarges the scope of understanding on the part of the student; it does stimulate some students.

Contrasted with most of the other courses in the pharmacy curriculum, public health includes broad health implications and social realities. At the same time, the faculty are concerned by the review of selected portions of microbiology and parasitology which they feel to be unnecessary. They feel that caution should be used to avoid overlapping with the specific and basic principles of these courses.

Although the faculty generally accepted public health in their curriculum, their suggestions for strengthening the course as reinforcement for their own specialties remained somewhat limited. Several suggested that the two-unit introductory course, which has been offered, be enlarged to three or four units. (This change is programmed for the 1959-60 school year, with a four-unit public health course for pharmacy students.) Some believe training in first aid with laboratory experience would be invaluable; others dislike this idea because of concern over legal responsibilities.

As taught, public health has been presented to a combined group of pharmacy, dental, dental hygiene, and nursing students. Some faculty members were not aware of this grouping. These men, along with their colleagues who were aware of the practice, felt that offering "mixed" courses would encourage students to develop deeper understanding of their professional roles. Encouraging extra-curricular fraternization would be another step toward breaking through the student's professional segregation patterns and would tie in directly with "mixed" courses.

STUDENT INTERVIEWS

Pharmacist's role in the community

Students participating in this study were college juniors and seniors in their pharmacy curriculum. They were interviewed at the close of the semester during which they had been enrolled in the two-unit introductory public health course. They were a sufficiently homogeneous group that they might be expected to demonstrate a common understanding of the problem presented. Furthermore, having been professionally indoctrinated by the same faculty whose interviews have already been summarized, they might be expected to reflect some of the faculty views.

Students view the pharmacist's role as being divided into two constituent elements: (a) that for which he is technically trained, and (b) that for which there is a moral as well as professional obligation. Under the first heading fall such responsibilities as stocking, compounding, and dispensing of drugs. The pharmacist is also trained to be a consultant in drugs to both physicians and lay persons. Closely related to his technical skills are the moral, legal, and social obligations of the pharmacist. These include the need to keep abreast of changes in drug use and availability and the promotion of good health practices by educational techniques, e.g., displays, free literature for his public, and conversations. Active participation in service clubs and voluntary health organizations and cooperation with the local health department are other means through which pharmacists may fulfill their responsibilities. Social responsibilities are discharged in the dual capacity of being a pharmacist and a citizen.

Students displayed an unexpected awareness of major changes that have occurred in the pharmacist's responsibilities during the past decade. They knew that pre-packaging has done more than release time from compounding by

allowing for more consultation time. They were aware that over-the-counter diagnosing has become taboo and that the responsibilities of prescribing are being left to physicians. These observations underlie their estimates of the future.

In the coming decade, they anticipate an increasing dependence by physicians upon the pharmacist's knowledge to evaluate drugs for dosage, reaction, contraindication, product differentiation, etc. This dependence will probably promote closer inter-professional relationships. They expect the higher level of education required of pharmacy students to improve further their professional status.

There was, among students, a conflict in opinion on the type of drug outlets that will dominate. The few who commented on the commercial aspects of pharmacy (only twelve) were divided between supporting prescription stores and "super-market drugstores."

Only six out of seventy-five felt the pharmacist's role to be an unchanging one, characterized by the stocking and dispensing of drugs.

Problems foreseen by the students

The student approach to future professional problems was expressed in more specific terms than that of the faculty. Their problem areas, however, very closely parallel those described by their elders and include (a) communications, (b) attitudes toward community responsibilities, (c) health education, and (d) untapped potentials.

The first, communications, did not appear to be a problem insofar as intra-professional relations are concerned. Apparently, today's students feel that the self-imposed segregation by professional grouping in which they practice reinforces in-group communications. This idea is enhanced by their attitude toward medical students: pharmacy students are convinced that an attitude of superiority is acquired by medics, leaving the former as the unhappy underdog in the hierarchy of medical professions. Too frequently this notion is carried into the business world where barriers to communication are re-established. Consequently, relations with physicians neither are nor can they be as good as they might be, in the eyes of these students. In addition, the students note existing irritations created by both dispensing physicians and pharmacists who prescribe.

There appears little significant import attached by the students to relationships with others within the medical professions since their associations are less critically allied and of lesser frequency.

Students have suggested that the pharmacist and physician have only a superficial insight into each other's professional activities and responsibilities. This "ignorance" only contributes to unnecessary irritation which borders on inter-professional friction. Combining this unfortunate situation with the historically lower educational standards for pharmacists has helped to encourage a failure on the part of physicians to accept or to realize that the pharmacist is also a businessman. The students believe that much depends upon the professional and social contacts if this situation is to be changed. Their own university has done much to alleviate these tensions by its extension of the curriculum for pharmacists and by offering some "mixed" courses. In these classes two or more professional groups are given a common experience. According to those interviewed, this opportunity to exchange ideas encourages inter-professional respect through realization of the mutual advantages to be gained by cooperation.

The pharmacists have a new and important responsibility in the area of health education. Students feel that the advances in medical science have produced new problems with which the pharmacists must cope. All people are concerned about medical care and the economic consequences of ill health, and the students feel their professional roles will be strategically located to help provide information pertinent to these problems.

Students are concerned with their ability to recognize symptoms that should be referred to medical care. The increased volume of information they feel must be at their command if they are to be expert drug consultants to physicians and the public presents another concern. They are thinking about the need to develop less expensive medications, a fee scale for older people whose incomes are fixed at a low level, and the uncontrolled sale of drug items, as in grocery stores. These and other specific problems anticipated for the next decade illustrate the responsibilities students expect to undertake. A few (one in five) mentioned that these were problems the individual could not handle alone because they are too intimately connected with public relations, legislation, and joint professional efforts. They are best met locally by individuals and by professional organizations, and at state and national levels by larger organizations. The desire for one major *national* professional association similar to the AMA was expressed. The problem of drawing independent-minded pharmacists into active participation in such groups was recognized.

Public health in the pharmacy curriculum

General comments on the public health course were quite like those of the faculty. Coverage of material in subjects where extended courses are required, as in microbiology, pharmacology, and toxicology, was considered by many to be review. Others found the public health orientation a new viewpoint. About one-fourth of the group considered public health a coordinating, summarizing approach to knowledge acquired in other courses.

Topics suggested for inclusion or emphasis included some of a controversial nature. Among these were first aid, which challenges the individual's attitude toward his moral and legal responsibilities, disaster management, and group dynamics. During their course work in public health, students met their first inter-professional group experience. The majority responded with an interest in the potentials of such a cooperative approach to community health problems. They began to relate this type of organized approach with problems that would be confronting community groups when they become practicing pharmacists. The extent to which the idea of active participation in community efforts was accepted has been demonstrated by their definition of the pharmacist's role in the community. In addition, they expressed the desire for emphasis on the objectives and control measures exercised by public health groups in community health programs. There was an interest in public affairs and in problems relating to the social implications of their work.

CONCLUSIONS

Not always recognized by those interviewed was the fundamental difference between *the individual* and *groups of individuals* known as communities or the *public*. Although technical terms and concepts dependent upon them have been defined for a class, there will always be those who experience difficulty in trans-

lating into real life some terms and concepts learned in the classroom. Since there are relatively few opportunities for the average student to use some of the public health terms and concepts at this stage of his career in pharmacy, this may be one of the factors underlying the problem of communications. To help establish the idea that effective inter-professional communications are among the best means of resolving community problems the public health course, as taught in San Francisco, introduced group exercises. These provided the pharmacy students an opportunity to utilize their newly acquired public health concepts of problems with other professional student groups. The experience was well received. In fact, some students have recommended that more opportunities be provided for group work of this type.

Today's pharmacy students are obviously disturbed by what they feel is second-class status in a field where first-class training and personnel are needed. Their sensitivity to the situation was evidenced by the comparison drawn between medical and pharmacy students. What the young pharmacists will do to amend the situation is open for speculation. Faculty efforts to rectify this may be seen in the extensive curriculum modifications designed to narrow the educational gap between the professions. Some faculty members also encourage membership in professional societies as the best way to keep abreast of developments within the field as well as to provide an organized means of communication.

The seventy-five students interviewed repeatedly referred to their future responsibilities in health education. Effective work in this area requires an understanding of relationships among the various factors which determine the distribution of infectious diseases or the various conditions that disrupt the well-being of a community. These are the factors studied in the public health course undertaken by pharmacy students. Isolated facts in parasitology, microbiology, safety, and first aid do not provide the means by which to translate these bits of knowledge into practical know-how. A disease may discomfort an individual; it may cripple a community. It is this wider application of public health principles that must be understood and appreciated if pharmacists are to be effective members of the health team which guards the health of the community.

If the effectiveness of a pharmacist means his ability to serve when and as needed, then the techniques of first aid should be among his skills. There are those who would restrict all first aid to the supplying of band-aids—because of legal responsibilities. There are others who would like public health to include a thorough laboratory course in first aid that would prepare the pharmacist to respond intelligently to his moral as well as his legal responsibilities. Such extended training could not be adequately included in a single public health course. Certainly it is a public health problem as witnessed by the assignment of medical services at the federal level of Civil Defense to the U.S. Public Health Service.(1)

It has been suggested that many of the difficulties that set pharmacists apart from active participation in health-oriented civic groups and from physicians lie in their respective backgrounds and their understanding of people as individuals and in groups. It is at this point that a public health course best serves the pharmacy student. It is intended that such a course help the pharmacist to prepare himself for membership on the large health team whose patient is the whole community.

SUMMARY

The means by which a single public health course may best serve the professional needs of pharmacy students have been studied. Both the pharmacy faculty and the students interviewed recognized that the public health course provides the majority of pharmacy students with their first introduction to the social implications of the disorders and diseases affecting man and his environment. Still, there was apprehension about the inclusion in a public health course of some particulars studied elsewhere in the pharmacy curriculum.

It was the general consensus of those interviewed that a single public health course has a broad responsibility in the pharmacy curriculum. 1. It should present the fundamental public health concepts, especially as they apply to the field of pharmacy. 2. It should attempt to reinforce existing lines of professional communications. 3. A public health course should enhance the student's vision of his potential personal and professional contributions to the well-being of his community. 4. A public health course should acquaint the student with the type of public health resources and agencies with which he will be associated in discharging professional services. 5. Finally, a public health course should integrate, summarize, and extend the student's knowledge of health problems as they are manifested in the total community.

REFERENCE

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I am convinced that much of the present state board examinations has little to do with the competency of a pharmacist, and they certainly must be looked upon as quite inadequate as a means of determining just how well the applicant has coped with the pharmaceutical curriculum.

Robert L. Swain, *Am. J. Pharm. Ed.*, 13, 61 (1949)

REPORT OF THE DELEGATES TO THE AMERICAN COUNCIL ON EDUCATION

The 1959 meeting of this Council was held in Washington, D.C., in October. The theme of the meeting was "College Teaching."

The opening address was delivered by Dexter Perkins, President, Salzburg Seminar on American Studies, a Professor Emeritus of Cornell University, who discussed "The Satisfaction of a Teacher of History." Pointing out that there is general agreement that teaching is important, he emphasized his belief that college administrators, in selecting teachers, should inform themselves fully of the capacity of their appointees to teach. They also should insist on adequate emphasis on teaching ability in training for the doctorate; he felt that standards could be raised in this respect.

Among the major satisfactions which he has found in teaching, he listed: 1. contact with superior students; 2. distribution of human facts in which raw material was related to insights; 3. the "value of spreading oneself thin." (His broad interests need not occasion apologies. By contrast, the medical profession, he feels, is little interested in social implications of its actions); 4. the revision of one's own conclusions (events change in perspective with the passage of time); and 5. the enjoyment of the drama and the humor of history.

He concluded that college teaching is an excellent career, but that social sacrifices must be imposed upon the people in order that educators will be able to do their best jobs.

Dr. Lee DuBridge, President of the California Institute of Technology, paraphrased the Sigma Xi motto for the title of his address, "Companions in Zealous Learning." The burden of this paper was that the college is a center of learning, not just of teaching or research. If students and teacher become companions in zealous learning, both can be active instead of passive in their roles, and our large areas of ignorance would be emphasized with more fruitful results. Due to the future needs of society to develop leaders the professor must help those rare students of great ability to explore and to learn. Research projects should be regarded as adjuncts to the learning process. It is obvious from these points that many times classroom duties are too great for the professor to devote adequate time to such work. It is equally true the college cannot operate like a factory without endangering intellectual decay.

The dinner session was addressed by Dr. John Gardner, President of the Carnegie Corporation of New York. His subject was "The University in Our Civilization." Dr. Gardner's address dealt with the remarkable change the university is undergoing with respect to its role in the world. He suspects that university people themselves are largely unaware of the extent of these changes. It is not a question of whether it will be active in the world of affairs, but of whether, in meeting the demands made upon it, the university will exhibit qualities of statesmanship, or function as a badly organized supermarket. Up to now too much of the entanglement with the rest of society has been unplanned, undirected, and inadvertent.

Dr. Gardner finds the changes occurring at three levels: 1. faculty members devote part time to consulting, or non-academic employment, making the university a reservoir of high-talent manpower to be drawn upon by the rest of society; 2. involvement of the university in some explicit responsibility requiring support, or threatening to consume much faculty time and energy; 3. those activities in which the university finds it has a continuing institutional responsibility. Examples of each class of involvement were cited. The address concluded with a plea that the universities debate their role in society as fully and as vigorously as they debate the other great issues of academic life. In this manner they might derive a rough sense of priorities in their extra-mural ventures. He further hopes that "... in everything the university undertakes in the world of affairs would bear the indelible stamp of the university's style, and that it would be marked by its commitment to the highest standards of performance, its habit of taking the long perspective, its preoccupation with the root of problems, its intellectual approach to practical matters, its disciplined habit of mind, its commitment to the highest values of our culture, and its relative disengagement for the self-interested considerations which move protagonists in the day-to-day strife of the world."

The final luncheon session heard an address by Dr. O. Meredith Wilson, President of the University of Oregon. His subject was "Wisdom is Better Than Strength."

After reviewing some of the highlights of the earlier addresses, Dr. Wilson pointed out that, of course, the question today was how we can help assure the teacher of 1970 that he, too, can be happy. Prospects of salary and status are more exciting than have heretofore been known in the United States. But this may turn into a bitter memory instead of a vision of hope if the quality of our education suffers.

In order to assure success he points out that we can do several things. First, take steps to assure an adequate supply of teachers for the growing student body by modifying our procedures for teacher utilization and by expanding our teacher production facilities; second, redesign our curriculum with the deliberate objective of preparation of college teachers; and third, improve articulation between the various segments of the educational world, cultivating respect among the parts and reducing presently existing barriers.

The most important resolutions adopted at the meeting of the Council may be summarized as follows: 1. that the "forgiveness" clause in the Student Loan section of the NDEA be extended to students preparing to teach in institutions of higher learning; 2. that the federal college housing loan program be extended and expanded; 3. that American institutions of higher education have a responsibility to include among their programs of major importance the development of higher education with relation to international affairs; and 4. that the member institutions and organizations be urged to support legislation in the various states to eliminate the "diploma mills."

Full text of the addresses and business activities will appear in the 1960 issues of the *Educational Record*.

K. L. Kaufman and G. L. Webster, Delegates

REPORT OF THE DELEGATE TO THE AMERICAN PHARMACEUTICAL ASSOCIATION HOUSE OF DELEGATES MEETING

The House of Delegates of the A.Ph.A. met in Cincinnati, Ohio August 19 through 21, 1959. Three full sessions were conducted with 149 delegates out of a possible 175 in attendance. Chairman J. Warren Lansdowne presided.

A complete Report of the House of Delegates was published in the September, 1959, issue of the *Practical Edition, J.A.Ph.A.* This report will cover only those items on the agenda considered to be of interest or importance to the AACP membership.

In his address to the House, Chairman Lansdowne suggested that colleges of pharmacy would be well advised to give greater emphasis to the quality and quantity of programs in continuing education for practicing pharmacists. In reference to drug standards, he alluded to the improved curricula in colleges of pharmacy which better prepare graduates in pharmacy to assume a more important role as sources for drug information. Members of pharmacy boards were reminded of their responsibility to support pharmaceutical education and to give adequate supervision to the practical experience requirement. A resolution passed at the Los Angeles meeting to establish new requirements for membership in the A.Ph.A. was criticized by Mr. Lansdowne with the request that it be reconsidered by the Resolutions Committee.

Professor Lyman D. Fonda reported on the activities of the Committee on Student Branches. Membership figures indicate that 12,579 students were listed in 1959. Sixty per cent of the graduates in 1956, 1957, and 1958 subscribed to the three year active membership program. Additional space has been made available in the *Practical Edition, J.A.Ph.A.* for reports of student branches. A student branch newsletter was attempted by a member college without success.

A report on the proposed addition to the headquarters building in Washington, D.C., was presented by Dr. Robert P. Fischelis. Anticipated date of completion and dedication is August, 1960, at which time the Association will hold its annual convention in that city. The 1961 convention of the A.Ph.A. is scheduled for Chicago, Illinois in the month of April. The Time and Place Committee recommended that future conventions be held in the spring of the year.

Reports on the USP and its forthcoming convention were presented by Dean Lloyd M. Parks and Dr. George D. Beal. Dr. Justin L. Powers reported on the revision of the NF.

A number of resolutions were adopted by the House of Delegates. Of particular interest to colleges of pharmacy were those dealing with the reference committee system for consideration of resolutions; time and place; National Science Fair participation; function of the Committee on the USP; formation of an Industrial Pharmacy Section; dedication of the 1960 National Pharmacy Week to pharmacy careers and student recruitment; es-

establishment of an A.Ph.A. agency to centralize planning, direction, and coordination of student recruitment; an open house program in all colleges of pharmacy during National Pharmacy Week; recognition of practical experience in hospital pharmacies by state boards of pharmacy; and hospital outpatient dispensing as an unfair practice. The resolutions concerning pharmacy careers were introduced on behalf of the AACP.

J. Warren Lansdowne was re-elected Chairman and Wilbur E. Powers Vice Chairman of the House of Delegates. The Interim Meeting of the House will be held in Washington, D.C., in March, 1960, in conjunction with the decennial USP Convention.

John G. Adams, Alternate Delegate

... the present system of state board examinations is overdue for replacement by demonstrably superior techniques of measurement. A nation-wide system of licensure examining executed by continuing teamwork of specialists in pharmacy and in test technology is prescribed.

H. H. Remmers, Am. J. Pharm. Ed., 13, 70 (1949)

REPORT OF THE REPRESENTATIVES TO THE NATIONAL DRUG TRADE CONFERENCE

The annual meeting of the National Drug Trade Conference was held in Washington, D.C., on January 7, 1960. All constituent organizations were represented. The three delegates of the American Association of Colleges of Pharmacy, Dean E. E. Leuallen, Dean Joseph B. Sprowls, and Dr. Hugo H. Schaefer, were all in attendance. President Robert P. Fischelis presided.

The meeting was opened with a few preliminary announcements by the President, the minutes of the previous meeting were approved, and the Secretary-Treasurer's report, showing a balance of \$1273.23 on hand, was accepted.

The first speaker was Dr. E. G. Klarmann of Lehn and Fink, Chairman of the Precautionary Labeling Committee of the Chemical Specialties Manufacturers' Association. He presented a report on the label requirements of Senate Bill 1283 and House Bill 5260 which, for all practical purposes, are identical. He stated that this legislation would provide the public with a degree of much needed protection, but also expressed the opinion that precautionary labeling was not "in itself the complete answer to a problem where consumers' habits are of such vital importance." He thought that the public must be educated and made aware of the dangers of hazardous household and specialty products and informed how to minimize these dangers in order for a comprehensive and effective program to result. Mr. Robert Ackerley, Counsel for the Chemical Specialties Manufacturers' Association, discussed Dr. Klarmann's paper and stated that the understanding and comprehension of the proposed legislation was essential and necessary if public support was to be obtained.

J. K. Kirk, Assistant to the Commissioner of the Food and Drug Administration, was then introduced. He presented a talk on the Food Additives Amendment to the Food, Drug, and Cosmetic Act. He explained the provisions of the Amendment and some of its probable effects.

The next speaker was Dr. H. S. Verhulst of the Public Health Service who reported on the activities of the National Clearing House for Poison Control Centers. He stated that this bureau was a service organization which issues continuing bulletins to interested and cooperating groups and provides materials, including slides, on its activities. He asked for the cooperation of the state pharmaceutical associations in educating parents to keep potentially harmful substances out of the reach of children and stated that the March issue of the *Journal of the American Pharmaceutical Association* will carry a series of articles on poison control activities by pharmacists and will offer to provide pharmacists with suitable speech material as well as slides for presentation to lay groups.

Another speaker was Mr. B. V. McFarland, Assistant Director of the Division of Federal-State Relations of the Food and Drug Administration. He described the efforts being made to obtain cooperation between the Federal Food and Drug Administration and the corresponding state agencies.

Mr. R. M. Ware, Secretary of the Virginia Board of Pharmacy, also presented a paper on this same subject stressing the importance of what he preferred to call "coordination" rather than "cooperation." He presented drug law enforcement problems from the state boards of pharmacy point of view.

Next, Dr. Robert P. Fischelis, Chairman of the Special Committee on Uniform State Pharmacy Laws, presented his report. He stated that his committee had enlisted the services of Dr. Robert M. Leonard of George Washington University School of Pharmacy to study and tabulate the medicinal products on the shelves of a modern wholesale drug company with regard to ingredients, label warnings used, and dosage statements, in the hope that such organized information might be of aid in developing classes of drugs for purposes of distribution. The original report, presented by Dr. Fischelis, included a resolution, later withdrawn, by his Committee which read as follows:

Resolved, that it is the sense of the National Drug Trade Conference that, as a general proposition, prescription legend drugs which are reclassified by the Food and Drug Administration as meeting the requirements for transfer to the nonprescription legend status should continue to be dispensed only by or under the personal supervision of a registered pharmacist, subject to such exceptions as may be dictated by the future status of such drugs.

The resolution was referred to the Resolutions Committee and, incidentally, was the only resolution that came before the group. The Resolutions Committee could reach no agreement and decided to report the resolution back to the Conference without recommendations. Accordingly, it came up before the full group of delegates.

The delegates of the AACP were strongly of the opinion that all transferred prescription drugs should be sold only by or under the supervision of pharmacists in registered pharmacies, but they thought the resolution as presented failed to provide for this because of the final qualifying phrase reading:

subject to such exceptions as may be dictated by the future status of such drugs.

A motion to delete this phrase from the resolution was presented, but this was objected to by a delegate of The Proprietary Association, and, in this connection, it must be remembered that in the NDTC meetings all actions must be unanimous. The motion to amend the resolution was, therefore, defeated.

In addition to voicing objections to the inclusion of the objectionable phrase in the resolution, the AACP delegates through their Chairman, Dr. Schaefer, also expressed the opinion that passage of a resolution limiting the sale of transferred prescription drugs to licensed pharmacists and making no provisions for the thousands of other drugs would give the impression that all such other drugs, regardless of their nature, were in the opinion of the Conference and its constituent organizations safe for general distribution through any type of retail outlet. Furthermore, it was evident to the AACP delegates that the qualifying and objectionable phrase in the resolution would weaken the position of the state associations which are trying to obtain legislation restricting the sale of *all* drugs transferred from prescription to counter sale status to pharmacists.

Nevertheless, your delegates did not wish to vote against the resolution for fear of giving the impression that they did not favor the principle of

restricting the sale of the drugs in question to pharmacists. They, therefore, asked that the report be referred back to the Committee for further study. This was done, and the Committee submitted a modified report, deleting the resolution in question. This modified report was approved by the Conference.

The Nominating Committee then brought in its report, and, in accordance with its recommendations, all officers were re-elected for another year. These are:

President, Dr. Robert P. Fischelis

Vice President, James E. Allen

Secretary-Treasurer, Ray C. Schlotterer

E. E. Leuallen, J. B. Sprowls, and Hugo H. Schaefer, Representatives

In the management of our lives and in our relations with our neighbors at home and abroad we have gained little in wisdom, if the results are to be measured in terms of a better organization of our social institutions for human betterment and happiness.

Earl J. McGrath, *Am. J. Pharm. Ed.*, 13, 129 (1949)

MINUTES OF THE INTERIM MEETING EXECUTIVE COMMITTEE

Bismarck Hotel, Chicago, Illinois

November 9, 10, 1959

Chairman Hewitt called the meeting to order at 9:30 A.M., November 9.

Present: Chairman H. G. Hewitt; Past President, L. C. Zopf; President, C. W. Bliven; Vice President, H. M. Burlage; Members, L. W. Busse, G. P. Hager, E. A. Swinyard, K. L. Waters; Secretary-Treasurer, G. L. Webster, and Editor, M. R. Gibson.

1. Approval of the Minutes of the Annual and Post-Session Meetings.

Since these had not been submitted, approval could not be granted.

2. Additions to the Agenda.

A number of additions to the agenda were proposed and listed.

3. Communications.

a. From the chairman of the Joint Committee on the Status of Pharmacists in Government Service requesting the allotment of one hundred dollars as the Association's share of committee expenses. Permission was granted to add this expenditure to the budget for 1959-1960.

4. Report of President Bliven.

President Bliven reported that Dr. Ewart A. Swinyard had replaced Dr. Alfred N. Martin as the Association's representative on the Council on Conference of Teachers.

5. Summary of the Annual Meeting.

The Secretary was instructed to prepare a summary of the actions taken at the annual meeting for distribution to the member colleges by mail.

6. Report of Progress on Resolutions Passed at the Annual Meeting.

Resolution No. 1. The establishment of a central office and the employment of a full-time secretary and staff. A progress report was made by Past President Zopf. The subcommittee was instructed to formulate a statement of the benefits to be derived and the changes in dues and other income needed to implement this resolution. On the second day of the meeting, after discussing the tentative budget proposed by the subcommittee, the following *motion* by Bliven-Zopf was adopted: The Executive Committee recommends that the annual dues be five hundred dollars per member college and that a committee be appointed to approach the American Foundation for Pharmaceutical Education with a request for an annual grant sufficient to underwrite a budget deemed adequate to establish and maintain a headquarters office and operation for the American Association of Colleges of Pharmacy.

Resolution No. 6. An official survey of research projects in member colleges. The Chairman has solicited information on research projects and will summarize the information and publish it in the *Journal*.

Resolution No. 7. The employment of nonpharmacy-trained persons as medical service representatives.

A vigorous discussion of the wording of the preamble to this resolution took place. The discussion arose over the possibility that in stating the situation concisely the wording might be misinterpreted as being hyper-

critical. No changes were made in the wording. The resolution was disposed of as directed by the Association.

Resolution No. 8. On the need for more accurate knowledge of manpower supply and demand in pharmacy.

The Chairman designated Dean E. E. Leuallen as the chairman of a subcommittee to confer with Assistant Secretary Mahaffey of the NABP and Secretary Apple of the A.Ph.A. as to a method of procedure to obtain the information wanted.

Resolution No. 9. On redefinition of the duties of the Committee on Educational Standards.

This was referred to the Committee on Constitution and Bylaws for implementation.

Resolution No. 10. On the need for a policy guide for the improvement of administration and instructional activities.

Discussion of this matter led to the suggestion that the Committee on Educational Standards, to which this resolution was referred, should concern itself also with the multiplicity of course titles for what, presumably, were similar syllabi of instruction in the professional areas. This appeared most obviously in the report of the Committee on Curriculum presented at the 1959 annual meeting. It was suggested that the Committee on Educational Standards would serve a very useful end by recommending a reasonably standardized nomenclature for course titles which would lead to more general understanding and easier evaluation of transfer credits in the professional areas.

Resolution No. 11. On the need for a central office to direct recruitment efforts.

Dean Parks, Chairman of the Committee on Recruitment Aids, by invitation and as well as the Secretary spoke of a recently concluded meeting of a majority of that committee with Secretary Apple of the A.Ph.A. at which this matter was discussed. On the recommendation of the Committee on Recruitment Aids, the following motion was *moved* by Bliven-Burlage and passed:

"The American Association of Colleges of Pharmacy, with the consent of the American Foundation for Pharmaceutical Education, will turn over to the American Pharmaceutical Association the film distribution and brochure, *Shall I Study Pharmacy*, programs including the existing and committed funds for the support of these programs if and when the American Pharmaceutical Association expresses its willingness to continue these programs on an active basis and establishes a recruitment agency in the A.Ph.A. headquarters to develop and administer an over-all, coordinated recruitment program in which the AACP maintains active participation. It is understood that the A.Ph.A. will create an Advisory Commission on Careers in Pharmacy to include representation from all segments of pharmacy."

It was further *moved* that the decision on the foregoing recommendations be transmitted to the Secretary of the A.Ph.A. in the immediate future and prior to the meeting of the A.Ph.A. Council on December 8, 1959.

Resolution No. 14. On support of legislation to authorize general or flag officers in the Medical Service Corps of the armed services.

The Secretary was directed to write to Congressman Durham transmitting the approval of the Association of this matter and urging the passage of HR 6240.

Resolution No. 15. Expressing disapproval of the short courses for training pharmacy technicians offered by the U.S. Navy and the U.S. Air Force.

The Secretary was instructed to transmit the resolution to the appropriate officers of these departments.

Resolution No. 16. Expressing commendation for General Sylvan B. Hayes, Surgeon General of the United States Army, retired, for his contributions to military pharmacy.

The Secretary was instructed to transmit the resolution to General Hayes.

Resolution No. 19. Drawing attention of the Committee on Curriculum to the need for a course in public health.

The Secretary was instructed to call the attention of the Committee on Curriculum to this matter.

Resolution No. 22. On a cooperating committee to study problems associated with education for hospital pharmacy.

President Bliven was asked to name a subcommittee drawn, in part, from the Committee on Hospital Pharmacy Education, with additions if desirable.

Resolution No. 24. Expressing thanks to Dr. Leland A. Powers for his valued contribution to the program of the annual meeting.

This was done.

Resolutions Nos. 25 and 26. Expressing appreciation for the excellent planning and programming of the annual meeting.

The Secretary was instructed to transmit these resolutions to the officials of the A.Ph.A.

7. Interim Meeting.

An invitation to hold the interim meeting of the Executive Committee as a guest of the Upjohn Company had been received and necessarily declined since arrangements had previously been made to hold the meeting in Chicago.

8. Educational Liaison Committee

It was proposed that the AACP take the initiative in the formation of a consultative committee comprising representatives from this association and the educational committee of the Industrial Pharmacy Section of the A.Ph.A., the American College of Apothecaries, the National Association of Retail Druggists, and military pharmacy to consider matters of educational importance and other matters of mutual concern. A subcommittee of the Executive Committee composed of Busse, chairman, Hager, and Zopf was named by Chairman Hewitt to implement this proposal.

9. Mail Order Diplomas.

Attention was called to the problem of the mail order "educational" institutions which offer diplomas in a variety of fields. The Chairman had taken steps to investigate one of these. This problem has been called to the attention of the Department of Health, Education and Welfare by the American Council on Education. It needs to be watched and corrective legislation sponsored at the state level, since most of these organizations have state charters.

10. Health Careers Exchange.

A copy of a bulletin with this title was presented and discussed. No representation for pharmacy was indicated, but information has been received that the Secretary of the A.Ph.A. is a member of the group and represents the profession.

11. District Meetings.

The places and dates for the meetings of the districts were listed. It was the consensus that each district meeting should be attended by an officer or a member of the Executive Committee who was not a member of that district to present a summary of the matters which the Executive Committee had discussed.

12. Annual Meeting and Teachers Seminars.

Invitations from member colleges who wished to act as host for the 1960 annual meeting and seminar on pharmaceutical education were opened and discussed. As a result of the voting, the invitation of the College of Pharmacy of the University of Colorado was accepted. The dates of July 3-9 inclusive were approved, subject to final confirmation by the host college.

13. Report of the Editor.

Editor Gibson presented a comprehensive report of (a) his plans for future issues of the *Journal*, (b) some comments regarding the published proceedings of the teachers seminars, (c) the publication of the annual survey of continuing education programs, and (d) the printing contract for 1960.

The report (a) was accepted with commendation for a task well managed. (b) A subcommittee composed of Hager, chairman, Swinyard, and Gibson was appointed to draw up a guide for the editing of the proceedings of the teachers seminars to the end that they may be more useful in libraries. (c) A recommendation that Chairman Waters of the Committee on Continuing Education be asked to make a summary of the titles and subjects considered in the programs of continuing education offered by member colleges. (d) The printing contract for 1960 in the amount of \$8907.25, exclusive of reprints, was approved.

14. Selection of a New Editor.

The subcommittee to select a successor to Editor Gibson made its report, and it was voted to offer the position to Dr. C. Boyd Granberg, Professor of Pharmacy, Drake University College of Pharmacy, Des Moines, Iowa.

15. Report of External Audit of the Treasurer's Accounts.

On motion of Busse-Burlage, the report of the external auditor, Albert C. Schneider, C.P.A., was accepted.

16. Enrollment Survey.

Chairman Hewitt presented first copies of the annual survey of enrollment in member colleges. Attention was called to the fact that the tables showed the enrollment for the final three years and, for this reason, the total enrollment should not be compared with the total of previous years which, in some instances, included first year or preprofessional enrollment.

17. Status of Students Whose Program of Study, Begun under the Minimum Four Year Curriculum, Is Interrupted and May Not Be Completed Before 1965.

It was moved, Zopf-Bliven, and passed that the following statement should be circulated to member colleges as representing the judgment of the Executive Committee.

"The Executive Committee cannot set policy for the individual member college. It wishes to point out that, within the limits of the dates established by the American Council on Pharmaceutical Education for the termination of admissions to the four year minimum curriculum, April 1960, and the limit permitted for completion of the minimum four year curriculum, April 1, 1965, the individual college determines its own policy regarding the readmission of students whose continuous progress has been interrupted."

18. Effect of the 2 + 4 Pattern of Curriculum on Hospital Pharmacy Programs.

This item emphasized the desirability of a general re-study of recommendations for this curriculum pattern. It was referred to the Committee on Curriculum for study and possible recommendations.

19. Joint Meetings with the National Association of Boards of Pharmacy at the Annual Meetings.

This suggestion was made because of the mutual benefits derived from meetings at the district level. Approval was general, but no definitive action was taken.

20. Unofficial Questionnaires.

Faculty members as well as deans are becoming annoyed at the multiplicity of questionnaires which they are requested to complete. The Secretary was instructed to remind the deans that the subject matter of all questionnaires should be proposed to the Chairman of the Executive Committee and receive his clearance. The purpose of this is to avoid duplication of effort. When the questionnaire is sent out, it should bear the statement: The subject matter of this questionnaire has been approved by the Executive Committee. Questionnaires lacking the approval statement should be returned to the proponent with a statement as to the reason for its rejection.

21. Positions Available in Member Colleges.

The Chairman reported that this compilation was well under way and would be completed and circulated.

22. Publication of Constitution and Bylaws.

The Secretary reported that the Constitution and Bylaws as revised to 1959 will be published in the Winter, 1960 number of the *Journal*.

23. Survey of Summer Offerings in Professional Courses.

The Chairman reported that this information would be available in the next few months.

24. Increased Bonds for Officers.

Due to the larger sums of money now being handled, larger fidelity bonds for the Treasurer and Chairman were authorized.

25. Inclusion of Affiliate Members in Questionnaires.

The Chairman was asked to write to the deans of the schools which hold affiliate membership and determine if they wish to be included in the circulation of questionnaires.

26. Graduates with Degrees of Doctor of Pharmacy in Academic Positions.

The consensus was that while holders of this degree might eventually qualify by reason of demonstrated research activity and publications, the professional degree does not have equivalent standing with the Master of Science or Doctor of Philosophy degrees. Persons with the professional degree only should not be appointed to major teaching positions. This statement is in harmony with the statement made in this connection in the *Accreditation Manual* of the American Council on Pharmaceutical Education.

27. Payment for Brochures Used by Committee on Recruitment Aids.

The Committee on Recruitment Aids furnished the National Science Teachers Association with 32,000 copies of *Shall I Study Pharmacy*. The funds for this gift were furnished by a special grant from the American Foundation for Pharmaceutical Education. The funds for the printing and distribution of the brochure are carried in the general funds of the Association. It was approved *on motion* of Webster-Busse that a transfer of funds from the Recruitment Aids Fund to the General Fund be made to compensate for the cost of these brochures.

28. Company Award to Students.

The consensus on the acceptance of awards by individual companies to students in member colleges was that this was a matter in which the Association can properly express no opinion.

29. Combined Curriculum in Pharmacy and Medical Technology.

The proposal for a combined curriculum in pharmacy and medical technology was referred to Dean Hager for more information and a report at a subsequent meeting.

30. Preservation of General Education in the Curriculum.

Concern has been expressed to members of the Executive Committee that one of the major educational benefits of the five year minimum curriculum is in danger of being lost in some of the new programs. The consensus was that member college faculties should be on their guard against yielding to enthusiasm for increased hours for scientific or professional courses at the expense of the humanities or social sciences.

31. Membership of the University of the Philippines.

It was pointed out that the University of the Philippines had continuously maintained its membership in this Association and had complied with the requirement that an accredited delegate attend the annual meeting at least once in three years.

The meeting adjourned at 12:15 P.M., November 10, 1950.

George L. Webster, Secretary-Treasurer

PRESIDENT'S SECTION

IN PROPER PERSPECTIVE

During the past several years administrators and faculties of our schools and colleges of pharmacy have devoted much time and attention to the development of the five year curriculum. This effort has the one major objective of graduating young men and women professionally competent and possessing a background in education enabling them to take their place in the society of their time.

For some time university administrators have been concerned with the coming "tidal wave" of students. As a result, much planning is in progress to cope with the sheer numbers seeking education beyond high school. Community colleges are being expanded and new ones are coming into being; existing colleges and universities are increasing housing facilities as well as classrooms and laboratories. Beyond these "brick and mortar" aspects, much concern has been expressed about the faculties—the essential part of an educational institution that is beyond the abilities of engineers and government loans.

In addition to the mere increase in facilities, much has been written on greater use, more efficient use, of the classroom and laboratories now in existence. In this regard, the extension of the school year from two to three semesters or the addition of a fourth quarter to the usual three-quarter year is receiving attention. If properly administered this idea has great merit.

However, it is the opinion of the writer that as the concepts of extending the traditional academic year and the inauguration of the five year program meet in our schools and colleges of pharmacy, each must be viewed in its proper perspective. The longer curriculum is designed to be of greater value to our graduates and to the public; the longer school year is designed to make greater use of physical facilities. The latter should not be utilized solely for the purpose of reducing the time required to acquire the degree. If these two concepts are combined without proper forethought, greater use of the physical facilities will be the major accomplishment; under a compulsory accelerated program the value of the five year program will be decreased.

During the emergency years of World War II, the majority of our schools and colleges of pharmacy accelerated their programs in order that the most effective use of our manpower could be realized. That the accelerated program *should not* be continued beyond the emergency was emphatically brought out in 1944 in the large majority of reports from more than forty deans. (1) The Executive Committee of our Association at its meeting in November 1945 "... recommended that the accelerated program in all member colleges be terminated on or before August 1, 1946 except ... where the calendar of the institution prescribes continuous operation and such calendar is mandatory on the school of pharmacy." Thus, it is clearly evident that the

accelerated program, born of necessity, did not find favor with the deans, not to mention the faculties. Certainly, the return to the traditional academic year in September, 1946, was not necessary because of a lack of students or because the veteran students were uninterested in graduating at the earliest possible date.

In a second report in 1945 on the accelerated program (2), forty-four of fifty schools indicated they did not like the program and would not continue it; twenty-seven of fifty-three stated their standards had been lowered; forty-six schools stated that it was not good educational philosophy to argue that students could accomplish in thirty to thirty-two months what they had formerly taken thirty-six months to do; and *no* school felt that either students or faculty would follow an accelerated program under normal conditions.

In view of this experience, it would appear that any thought of returning to an accelerated program should be given very careful thought. Existing faculties successfully carrying on an educational program in the traditional manner cannot carry on a program of equal value on an accelerated basis. Research, continuing education programs, and participation in the activities of professional associations are not compatible with an accelerated program. Additional faculty personnel would be necessary to maintain accelerated curricula at the educational level of present programs. In view of the present short supply of teaching personnel, the enlargement of our faculties does not appear feasible at this time. Should our faculty members concerned with the teaching of graduate students be required to direct their efforts to the additional personnel needs of an accelerated undergraduate program, our supply of teachers for the future could be seriously affected.

Should our students be required to accept an accelerated program? The answer to this question is in the negative. To attempt to force all students carrying a full program of basic sciences or professional courses to accept the speeded-up program would be an error. Especially would this be true in the first two years of this curriculum. There is no question that many potentially good students begin their college careers as immature, improperly motivated, young men and women. This is not a criticism, merely a statement of fact. Experience soon teaches that "forced growth" in such cases is a mistake. The summers provide such students time to evaluate their accomplishments and, if necessary, to redirect their efforts. Too, time for improved motivation is provided, perhaps through employment in one of the areas of his chosen profession. The first year or two of the five year program is designed to permit the necessary development to take place and thus provide our professional program with a better qualified and better motivated student. To require an accelerated program would remove this advantage.

If the compulsory accelerated program becomes effective, would not this mean that the experience requirement would be postponed, of necessity, until after graduation, thus, partially negating, at least in most states, the time advantages of the accelerated educational program? All but a few of the states require a year of practical experience in order to be eligible for examination for licensure. In most cases this experience must be non-concurrent with registration in an educational program. In such instances a compulsory accelerated program initiated for the purpose of shortening

the time in which students may become registered does not truly achieve its stated objective, and, in addition, it eliminates the period for maturation and motivation believed to be essential in the case of many of our students. Only in a few states where a part of the experience must be gained following graduation would an accelerated program really be time-saving in achieving the status of a registered pharmacist.

In 1945, the late Dean Lyman, as Editor of our *Journal*, included in the Editor's Page a statement of Isaiah Bowman who was then serving as President, John Hopkins University. (3) Quoted here in part, this statement, even though it has reference to the programs conducted during World War II, climaxes very well this discussion.

We shall return to the two-semester system on February 1, 1945, with the firm knowledge that "acceleration" is no substitute for an education in which maturity as well as effort plays a part. The truth is inescapable that it takes time to think. The so-called leisure of college students and faculty is a myth.

REFERENCES

- (1) Wilson, Robert C., *Am. J. Pharm. Ed.*, 9, 59 (1945).
- (2) Lee, C. O., *ibid.*, p. 377.
- (3) *Am. J. Pharm. Ed.*, 9, 152 (1945).

Charles W. Bliven

... Those who achieve distinction in their profession are usually men or women of broad interest and understanding, capacities which have traditionally been thought to develop from the study of the varied disciplines embraced in the liberal arts.

Earl J. McGrath, *Am. J. Pharm. Ed.*, 13, 131 (1949)

EDITORIAL

In 1939 a group of faculty members at Harvard University prepared a report entitled "Report on Some Problems of Personnel in the Faculty of Arts and Sciences". The following are quotations from that report:

Both teaching and research are recognized as criteria because the University is a center where learning is not only advanced but also disseminated through the influence of older upon younger minds.

... In so far as Harvard seeks to attract the most ambitious and talented students, the University owes these selected individuals teaching of the highest possible order. It becomes the duty of the University in selecting its staff to take account of this exacting requirement. ... While it is important that Harvard should be a community of scholars, it is also important that the members of its faculties should regard themselves as a community of teachers.

Harvard thus took cognizance of the necessity of stressing *teaching*, as well as research, as functions of that institution. This alone is not unique nor startling, but the objective of this part of the report was a reminder that universities are (or should be) communities of scholars. *Their principal responsibility is to teach.* Some university educators continue to confuse the primary mission of a university to teach with the zone of research which surrounds it. Most of our American universities are, after all, educational institutions rather than research institutes, the teaching function is surely the more fundamental. (The great need for research institutes in this country is another problem not within the scope of this editorial.)

An ideal university has been defined as a great society of scholars devoted to the preservation, interpretation, and advancement of knowledge. We in pharmacy must be aware that within the present framework of our institutions the *interpretation* plays the most important part.

If, then, our pharmacy faculties are primarily teachers and not researchers, our graduate programs in training teachers should reflect that concentration.

There are characteristics of a teacher and requirements for good teaching which should be recognized as distinct from the characteristics of a researcher and the requisites of a researcher. To ignore these differences is unrealistic. Too often our graduate programs produce mechanical proficiency; knowledge of accepted methods, principles or rules; and a reasonable acquaintance with the literature in the area of inquiry. Too few graduate programs produce people who have broad scholarly training, people who are interested in teaching and people who can look upon the problems of the student with understanding. Our graduate-school products often lack character and personality, energy, enthusiasm—all of the things which normally accompany an inspiring and stimulating personality. These people often lack the ability to be logical in their thought, thorough in their preparation, and willing to work at the job. We should be able to expect that our Ph.D. graduates who are headed for teaching should have initiative, originality, adaptability, and perhaps it would not be too much to expect a certain degree of refinement.

We have been so concerned with the competence of our graduate student in the area of his specialty that we have diverted attention from the graduate student as a person, his manner of dress, his grammar, his manner of speaking, his cultural interests, and his imagination. We have failed to recognize that

teaching is a very personal occupation. Students will not dissociate what the teacher knows from what he is. Effective teaching is to a large degree a matter of translation, and the student will not dissociate the translator from the translated. The personality of a teacher and what he knows are inalienably annealed, and teaching power will increase only as the teacher enriches his own life, as he broadens his own tastes, and enlarges his own horizons.

Do our graduate programs in pharmacy provide for the selection of students who can fulfill the desirable requirements, and do our programs provide for the development of the inherent characteristics of our graduate students to foster the attainment of these goals? I think the answer in both instances is "No."

What can be done? The first thing which should be done, not only to interest graduate students in teaching, but to encourage graduate students in general, is to stop treating them as second-class citizens. The lack of adequate research and teaching personnel from graduate schools is critical now; it will be even more critical in the years to come. The personal sacrifice which a graduate student makes in terms of creature comforts is well known. His sacrifice in intellectual broadening is less well recognized. Many schools fall short of recognizing these problems, and most do not do all they can to rectify them.

Why are graduate students so poorly housed on our campuses? We take great pride in the size of our graduate programs, the accomplishments of our research programs of which the graduate students are integral parts, but we consistently assign the poorest dormitories in the most remote parts of the campuses for graduate students. There will be those who say graduate students don't care where they live, that they are too dedicated to their studies. We have known a lot of dedicated graduate students, yet we know few who didn't appreciate a clean, modern, well-equipped dormitory and convenient, pleasant food facilities.

Food facilities on large resident campuses is a subject about which strong objections should be expressed. The mass feeding of students through cafeteria lines and the noisy bolting of food under very primitive standards of personal conduct are revolting to anyone sensitive to the elements of proper eating habits. We talk a great deal about the education of the whole man, yet we forget that the art of gracious living is a very important part of that whole man. Graduate students are usually thrown into this melange of feasting undergraduates who sometimes act like semi-barbarians. There is neither the proper atmosphere for dignified eating nor the stimulus for good conversation of which a successful communal meal is so much a part.

And, on another point, I wonder how many colleges offer the same reduction in ticket prices to cultural events to graduate students as they do to undergraduates? Do the graduate students get discounts on books at the bookstore? Are they encouraged to engage in athletics to the extent of their interest and needs? Most colleges would answer "No" to all of these questions. Yet we want well-rounded, well-read, and healthy graduate students.

A student who is active socially as an undergraduate suddenly finds himself a social outcast because he is a graduate student. If he gets back into the social swim, he finds it about as difficult as a fish climbing a fish ladder. The social programs for graduate students on a campus are usually minimal, often non-existent. Yet in our teachers we expect the social graces suddenly to burst forth out of the stagnant deterioration of years in graduate school.

We expect our teachers to be proud of themselves and confident of their activities, yet in graduate school we give them too little money as assistants or fellows to feed themselves properly, let alone dress themselves properly. The teaching assistant and fellowship stipends in too many institutions seem to have been devised on the basis of planned malnutrition and a Salvation Army wardrobe.

We have lived with this situation of maltreating the graduate student to the extent that we consider it part of the game—like fraternity hazing. And we rationalize that if he's worth his salt he will endure. This makes about as much sense as testing the quality of seed wheat by planting it in the Sahara Desert.

In short, for the sake of the future quality and quantity of graduate students we must stop deflecting them from an expansive and invigorating life which will help to produce the liberally educated, inquiring person who feels at home in a cultivated atmosphere.

On the academic side, all members of graduate faculties should take time to contemplate the dimensions of their own responsibilities. Doctors' degrees have too often come to mean a demonstrated ability in research and a technical background in a highly specialized segment of knowledge. Too few doctoral programs have produced individuals who are deeply educated in their related fields and who are aware of and appreciative of a broad general education. Graduate schools must educate more broadly and deeply than before, and particularly is this true if the graduate is to become a teacher.

The preparation for successful teaching is complete only when the teacher dies or retires, but early in his academic career, undergraduate and graduate, he must be given the groundwork of this continuing process of education as well as the opportunity to recognize the opportunity to enjoy the pleasures of this expanding experience.

A teacher who rises above mediocrity must deal with areas of knowledge beyond his own subject and must deal with them with a vigorous, independent mind. In his academic training he must be as a Joseph in Thomas Mann's *Joseph and His Brothers*, as described by Willa Cather in *Not Under Forty*:

Behind the bright promise in him there was the sound seed which would grow to its full measure under any circumstances and could not be circumvented.

The programs of prospective teachers should be individually planned if they are to meet the needs of the students who have different intellectual backgrounds, different abilities, and different potentials. There must be the greatest flexibility in programs. There must be a stress of fundamental principles not only in the subject-matter field but also in the understanding of the position of that subject-matter field as it relates to the totality of knowledge. And certainly there must be an appreciation of the importance of effective communication of that knowledge—in speaking and writing.

A prospective teacher of the pharmaceutical subjects should have as part of his background formal training in the philosophy of science, the history of science, psychology, statistics, public speaking, and extensive courses in English composition as well as the social sciences. These should be in addition to the advanced courses dealing with those fundamental sciences allied to his own area of specialization.

If it is necessary that a prospective teacher's research project be less time consuming than that ordinarily required, then it should be so planned. Too

many doctorate problems often deal with massing experimental data which manifest endurance rather than definitive thinking and originality.

It will be noted that courses in education for the prospective teacher are not recommended. The educationists have failed to convince, either by their products or by personal demonstration, that they produce or are themselves better teachers. There is no reason for taking education courses unless they contribute to better teaching. When educationists prove they have something to offer prospective college teachers, the students will ask to take their courses, and these requests will come whenever schools of education are able to demonstrate the value of their courses.

A prospective teacher during his Ph.D. training should be taken behind the scenes of the college teaching game and shown how results are obtained. He should have greater social contact with capable teachers. He should be given the opportunity to observe and to discuss teaching with inspiring and able teachers to see how scholars work and get results. He should be brought in on the ground floor of the mechanics of preparation involved in successful teaching. It has been said that successful teaching is 75 per cent preparation—good preparation. Graduate assistants who are going into teaching should be given the responsibility of interne teaching closely supervised by good teachers and possibly observed by fellow graduate students. This might well be part of a seminar or counseling program.

College teachers must be able to discover interrelationships, to organize knowledge into meaningful patterns. The interpretation of truth is no less important than its discovery, nor does it require any lesser exercise of intelligence. And mere practice does not make perfect. Guidance of prospective teachers is necessary.

As long as we deny recognition of the requirements for superior college teaching, just so long will superior college teaching be denied our students.

Melvin R. Gibson

ANNOUNCEMENTS

Teachers' Seminar. The Teachers' Seminar on Pharmaceutical Education sponsored by the American Association of Colleges of Pharmacy and the American Foundation for Pharmaceutical Education will be held at the University of Colorado, Boulder, July 5-8 following the AACP Convention. The program for this Seminar is as follows:

HORIZONS IN PHARMACEUTICAL EDUCATION

Tuesday, July 5, 1960

- | | |
|---------------------|---|
| 8:30 A.M.-9:30 A.M. | Registration
Forum Room, University Memorial Center |
| 9:30 A.M. | Opening Session
Room 140—Chemistry Auditorium
Chairman: Curtis H. Waldon
Opening Remarks
Welcome, Quigg Newton, President, University of Colorado
Presiding: Ewart A. Swinyard
Greetings from the American Foundation for
Pharmaceutical Education, W. Paul Briggs
Horizons in Pharmaceutical Education,
George L. Webster
Discussion |
| 12:00 | Lunch |
| | <i>General Education</i>
Forum Room, University Memorial Center |
| 2:00 P.M. | Presiding: Byrl E. Benton
General Education in the Professional Curriculum |
| 3:00 P.M. | Coffee Break |
| 3:15 P.M. | General Educational Values in the Pharmacy
Curriculum, Louis W. Busse |
| 4:00 P.M. | Discussion |
| 7:00 P.M. | Business Meetings of the Sections |

Education for Depth

Wednesday, July 6, 1960

- | | |
|------------|---|
| 9:00 A.M. | Forum Room, University Memorial Center
Presiding: Ole Gisvold
Delineation of the Professional Disciplines,
Louis C. Zopf |
| 9:45 A.M. | Discussion |
| 10:00 A.M. | Coffee Break |
| 10:15 A.M. | Education for Depth |
| 11:00 A.M. | Discussion |
| 11:15 A.M. | Specialization in Pharmaceutical Education,
Linwood F. Tice |
| 12:00 | Lunch |

Achieving Depth in the Specialties

- 2:00 P.M.-4:30 P.M. Workshops
Pharmacognosy
Presiding: James E. Dusenberry
Introductory Remarks, Robert L. Van Horne
Pharmacology
Presiding: H. C. Heim
Introductory Remarks, Ewart W. Swinyard
Pharmacy
Presiding: Martin Barr
Introductory Remarks, Byrl E. Benton
Pharmaceutical Chemistry
Presiding: Lee F. Worrell
Introductory Remarks, Takeru Higuchi
Pharmacy Administration
Presiding: Richard G. Kedersha
Introductory Remarks, Stephen Wilson
6:30 P.M. Dinner on Flagstaff Mountain
8:00 P.M. Speaker

Keeping Up to Date

Thursday, July 7, 1960

- Forum Room, University Memorial Center
Presiding: Robert L. Van Horne
9:00 A.M. Responsibility of the Professor, Martin Barr
9:45 A.M. Coffee Break
10:00 A.M. Responsibility of the Administrator, Harold G. Hewitt
10:45 A.M. Function of the Library and Librarian,
Ralph E. Ellsworth
11:30 A.M. Luncheon

How to Keep Up-to-Date in My Specialty

- 2:00 P.M.-4:30 P.M. Workshops
Pharmacy Administration. Chairman: Stephen Wilson
Summary of Morning Papers, Stephen Wilson
How to Keep Up, F. C. Hammerness
Pharmacognosy. Chairman: Robert L. Van Horne
Summary of Morning Papers, Robert L. Van Horne
How to Keep Up, Varro E. Tyler, Jr.
Pharmacology. Chairman: Ewart A. Swinyard
Summary of Morning Papers, Ewart A. Swinyard
How to Keep Up, Joseph P. Buckley
Pharmacy. Chairman: Byrl E. Benton
Summary of Morning Papers, Byrl E. Benton
How to Keep Up, Benjamin F. Cooper
Pharmaceutical Chemistry. Chairman: Takeru Higuchi
Summary of Morning Papers, Takeru Higuchi
How to Keep Up, Joseph H. Burckhalter

Horizons in Graduate Education

Friday, July 8, 1960

	Forum Room, University Memorial Center
	Presiding: Takeru Higuchi
8:30 A.M.	Trends in Graduate Education, Dayton McKean
9:15 A.M.	Discussion
9:30 A.M.	Coffee Break
9:45 A.M.	Graduate Education in Schools of Pharmacy, Melvin W. Green
10:30 A.M.	Discussion
10:45 A.M.	Integrating Undergraduate and Graduate Education, Glenn L. Jenkins
11:30 A.M.	Discussion

Evaluation and Projection of the Teachers Seminars

	Forum Room, University Memorial Center
	Presiding: George L. Webster
2:00 P.M.	Effects of the Teachers Seminars on Undergraduate Teaching, Joseph B. Sprowls
2:45 P.M.	Summary of the Present Seminar and Recommendations for the Future, Charles W. Bliven
3:30 P.M.	Discussion
4:00 P.M.	Closing Remarks, C. H. Waldon

Classification schemes sought. The Committee on Special Classifications of the Special Libraries Association and the Classification Committee of the Cataloging and Classification, Resources and Technical Services Division, American Library Association, are cooperating in a continuing project to develop and expand a Loan Collection of library classification schemes originally established by the Special Libraries Association. This Collection covers all fields of science, law, medicine, technology, the social sciences, and the humanities.

New libraries or libraries with special collections are constantly asking for classifications—in all areas of knowledge—and it is imperative that the Collection be kept up-to-date through the addition of new schemes or with modernized versions of existing classification schedules. Curators of special collections, special librarians, and those individuals who have developed special classification schemes for specific types of material or for special subjects are invited to contribute a copy of their work to the Collection. Classification schemes should be sent to: Dr. Jesse H. Shera, Curator, SLA Loan Collection, School of Library Science, Western Reserve University, Cleveland 6, Ohio.

West African flora. Mr. O. B. Dokosi, Mawuli Secondary School, P.O. Box 45, Ho, Ghana, West Africa, indicates that he is willing to supply plants from West Africa for study by interested persons. Mr. Dokosi is a botanist and graduate of the University of London.

Summer conferences for college teachers. The Summer Conference Program of the National Science Foundation was created in recognition of the important role of college teachers in developing our scientific manpower potential. These conferences are directed towards strengthening teachers' mastery of the

newer developments in science and mathematics and towards increasing their capacity as teachers. The shorter length of these conferences, one to three weeks, as compared with the more-familiar summer institutes of four to twelve weeks' duration, will enable college teachers who must teach during summer terms to familiarize themselves with recent advances in their specific fields. The conferences include subject-matter areas in biology, chemistry, engineering, geology, mathematics, and physics.

A number of conferences are scheduled for the summer of 1960. Funds are available to provide financial assistance for about 540 college teachers. The Foundation grant to each conference covers the cost of tuition, fees, stipends, and travel allowances. The conference, in turn, selects the teacher-participants and determines the amounts of the stipends to a maximum of \$15 per day, and the travel allowances. The latter allowance to each participant usually does not exceed \$80 calculated at a rate not exceeding four cents per mile for one round trip between home and conference. No dependency allowances are included in this program.

Participants will be chosen by the conferences, *not* by the National Science Foundation. Inquiries and requests for application blanks must be addressed to directors of the individual conferences, listed below, and *not* to the National Science Foundation. Early inquiry is advised.

Butler University. June 19-July 2: *Recent Developments in Non-Aqueous Solvents*; for college teachers of undergraduate chemistry. The theory and use of non-aqueous solvents will be presented by recognized authorities in the field. The problems of effectively incorporating this material into the undergraduate chemistry curriculum will be considered. Dr. Ralph K. Birdwhistell, Department of Chemistry, Butler University, Indianapolis 7, Indiana.

University of California, Berkeley, and Sacramento State College. July 31-August 12, at Berkeley: *Mathematics*; for college teachers of arithmetic curriculum methods courses and supervisors of elementary school arithmetic programs, with the aim of providing knowledge on the latest developments in the field of mathematics and experimental programs in elementary school arithmetic. Dr. George N. Beaumariage, Jr., Assistant Professor of Education and Engineering, Sacramento State College, Sacramento, California.

Carleton College, June 19- July 1: *Solid-State Physics*; for teachers of undergraduate college physics who have had no formal training in solid-state physics. Six experts will present an introduction to selected areas of this field. (Director of Program: Prof. Robert A. Reitz, Carleton College.) Write: Prof. William A. Butler, Department of Physics, Carleton College, Northfield, Minnesota.

Case Institute of Technology, June 13-July 1: *New Applications of Mathematics and Statistics in the Design and Operation of Complex Systems*; for college teachers of mathematics, science, and engineering. The conference will consist of lectures, case studies, and workshops devoted to developing the mathematical and statistical tools and illustrating their applications by means of actual case studies in industrial and military organizations. Problem solving in supervised work sessions. Prof. Burton V. Dean, Operations Research Group, Case Institute of Technology, 10900 Euclid Avenue, Cleveland 6, Ohio.

Biological Laboratory, Cold Spring Harbor. August 8-August 27: *Recent Developments in Molecular and Developmental Genetics*; for college teachers of genetics. The conference will consist of lectures, discussions, etc., conducted by

prominent scientists working in the field. It will begin with a discussion of problems in genetics and the chromosome structure, lead through a scrutiny of the structure and role of DNA to a presentation of biochemical and genetic control mechanisms in cells and tissue, and finally to a concept of the genetic aspects of cellular differentiation. Dr. Paul Margolin, Biological Laboratory, Cold Spring Harbor, Long Island, New York.

Colorado State University, August 8-August 26: *Genetics Teaching in Colleges*; for college teachers of genetics. Objectives and activities of the conference will include a review of genetic concepts to be included in the first course, planning laboratory exercises to teach these concepts using a wide variety of organisms, including fungi and bacteria, and a workshop to allow participants to become familiar with techniques used in culturing these organisms for genetic experiments. Dr. Donald R. Wood, Department of Agronomy, Colorado State University, Fort Collins, Colorado.

Cornell College, June 13-June 24: *Radioisotopes and Their Uses*; for college and junior college teachers of biology, chemistry, and physics. The conference will assist participants to gain sufficient background in radioisotope techniques so that they will be able to introduce some of this technology into their own undergraduate courses. Dr. Cecil F. Dam, Physics Department, Cornell College, Mt. Vernon, Iowa.

University of Florida, June 7-June 18: *Nuclear Resonance*; for college teachers of chemistry and physics with at least two years' experience. The conference will be devoted to the principles, instrumentation, and applications of nuclear magnetic and quadrupole resonance. Lectures by leaders in the field and some laboratory work in nuclear magnetic resonance will be included. Dr. Wallace S. Brey, Jr., Department of Chemistry, University of Florida, Gainesville, Florida.

Georgetown University, August 1-August 24: *Recent Advances in Astro-Geophysics*; for college teachers of physics and astronomy. A basic survey of the subject followed by talks by specialists on significant recent developments; emphasis on results from spectrographic, rocket, satellite, and radio-astronomical methods. Includes work at the Observatory with telescopes, spectrographs, and electronic computer. Rev. M. P. Thekaekara, S. J., Department of Physics and Astronomy, Georgetown University, Washington 7, D.C.

University of North Carolina, August 1-August 19: *Botany, with Emphasis on Plant Evolution and Plant Physiology*; for college and junior college teachers of general biology and general botany. The core of the conference program will consist of a three-week short course or lecture series in the above fields, six leading botanists lecturing for one week each. In addition, there will be several evening lectures on other aspects of botany and a field trip to the mountains or coast. Dr. Victor A. Greulach, P.O. Box 1268, Chapel Hill, North Carolina.

University of Oklahoma, June 6-June 30: *Computer Programming and Related Mathematics*; for college teachers of advanced undergraduate courses in engineering, science, or mathematics. The conference will consist of two lecture series, extensive laboratory training on a medium-speed digital computer, and opportunity to carry to completion a problem chosen by the participant. Dr. William Viavant, Computer Laboratory, University of Oklahoma, Norman, Oklahoma.

Purdue University, July 11-July 23: Chromatography: Theory and Practice; for college teachers of chemistry. A survey of gas-liquid, gas-solid, liquid-liquid, and liquid-solid chromatography and ion exchange, designed for those using or wanting to use these subjects in their teaching or undergraduate research programs. Dr. Warren W. Brandt, Department of Chemistry, Purdue University, Lafayette, Indiana.

Tufts University, July 12-July 22: Recent Advances in Chemical Bonding; for college teachers of chemistry. The conference will consider certain aspects of molecular orbital, valence bond, and ligand field theories. The concepts will then be applied to systems of current chemical interest. (Director of Program: Prof. M. Kent Wilson, Tufts University.) Write to: Mr. James R. Strawbridge, Director of Summer School, Tufts University, Medford 55, Massachusetts.

Washington University, June 7-June 30: Systems Engineering Theory for Chemical Engineering Teachers; for chemical engineering college teachers in systems engineering. The conference will stress the fundamentals of process dynamics and control engineering as applied to chemical engineering. Included are instructions in the theory and use of large-scale analog and digital computers in the analysis, synthesis, and optimization of chemical process systems. Prof. Gerald L. Esterson, Department of Chemical Engineering, Washington University, St. Louis 30, Missouri.

... unless pharmacy provides for the support of professional things, just to the extent that such support is not provided will the realization of the aspirations of pharmacy be delayed and perhaps doomed.

Edward C. Elliott, *Am. J. Pharm. Ed.*, 12, 718 (1948)

MEMORIALS

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WILBER J. TEETERS

After sixty-four years of administrative teaching and community service, as a faculty member of the State University of Iowa and as an official of the city of Iowa City, Dean Wilber J. Teeters died suddenly at Mercy Hospital in Iowa City, December 14, 1959. His service as a teacher at the University is the longest on record. He was ill but a short time, and was admitted to the hospital only on the previous Saturday afternoon. Pneumonia probably was the immediate cause, complicated by other factors related to old age. His ninety-third birthday occurred on October 10, 1959. He came to his laboratory two days before he was taken to the hospital.

Dean Teeters was born in a log cabin on an Ohio farm contiguous to the city limits of Alliance in 1866. He attended country school and then the Academy at Limaville, Ohio. In 1886 he matriculated at Mount Union College, Alliance, from which he was graduated in 1893, receiving the degree of Bachelor of Science. At Mount Union College he became a member of Sigma Alpha Epsilon fraternity, an affiliation that was always very dear to his heart and an absorbing interest throughout his life. In 1905 he founded the Iowa Beta chapter of Sigma Alpha Epsilon on the campus at the University. As a student at Mount Union College, then a military school, he was active in the affairs of the school regiment, serving in his senior year as the highest ranking officer—lieutenant colonel. In 1893, as an officer in the Ohio National Guard, his company was selected to serve as a special escort to William McKinley, then governor of Ohio, at the Chicago World's Fair. Mount Union College further honored him in 1897 by conferring upon him the degree of Master of Science for his scholarly work in plant physiology.

In the fall of 1893, Dean Teeters continued his education in the College of Pharmacy at the University of Michigan at Ann Arbor, Michigan, graduating with distinction and receiving the degree of Pharmaceutical Chemist in 1895. He served as president of his class in his senior year.

Dean Teeters came to Iowa City in 1895 on a one-year appointment as demonstrator in chemistry in the College of Medicine. Because of his previous teaching experience and his excellent scholastic achievement, he was recommended for the Iowa position by Dean A. B. Prescott of the College of Pharmacy, the University of Michigan. It was with reluctance, he has since frequently stated, that he accepted, having previously decided to enter retail pharmacy in company with a classmate. In 1901 he was transferred to the College of Pharmacy as an associate professor, and in 1903 he became professor of pharmacy. In 1904 he was appointed dean of the College of Pharmacy, which position he occupied until the age of retirement overtook him. During this period also, and long after his retirement, he served the state of Iowa as a toxicologist in which work he probably gained his greatest fame. Analyses he made of bodies and vital organs trapped many a criminal. There are not many county court houses in the state in which he has not, at one time or another, occupied the witness stand giving expert testimony in cases of suspected poisoning or some other unlawful act.

For years Dean Teeters lived at 61 Riverside Drive where he and Mrs. Teeters, in 1902, built a commodious home on the quiet wooded hills overlooking the Iowa River and the then embryo University. Here he watched the University progress from a few distant buildings across the river to a great institution spreading ever west and now occupying the very location where his residence stood. Here students without number shared his gracious hospitality, and many distinguished guests have memories of pleasant gatherings about the glowing embers of his fireside. Here now the University has taken over and has erected Hill Crest, a dormitory for men. More recently, Dean Teeters has lived at 301 Teeters Court, a street named after him in 1957 in recognition of his continuing services to the city and to the University. The street formally became Teeters Court on the Dean's ninety-first birthday.

Dean Teeters was a member of the Methodist church. He held the Silver Beaver award, the highest award offered by the Boy Scouts of America to adult members. He was a past president of the Iowa City Kiwanis Club, a member of Beta Phi Sigma, Phi Delta Chi, Rho Chi, and Gamma Alpha. He held membership in the American Pharmaceutical Association and the Iowa Pharmaceutical Association, both of which he served in many ways. He was a charter member of the Triangle Club, a University faculty men's social organization, and he was a member of the Masonic bodies. In 1904-05 and again in 1913-17, he was secretary of the American Association of Colleges of Pharmacy, an organization he served as president in 1920-21. He served long and faithfully on many University boards and committees. He was a member of the Board in Control of Athletics from 1905 until 1916, serving as chairman the final three years. He was always intensely interested in athletics, rarely missing a contest and frequently serving as an official at a track or swim meet. He played golf regularly until just a year or two ago, and it should be added that his handicap was being honest. From 1917, for about ten years, Dean Teeters was chairman of the important University Board of Social Organization and Affairs, and for many years he was a member of the University Board of Constitution. His good judgment and his wise counsel was always freely sought and always freely given.

Most men are content to put away their tools when their shadows have lengthened and twilight is approaching. Not so with Dean Teeters, being still youthful in spirit, strong in humanitarianism and mature in judgment. When the University rule called for his retirement, he at once concluded that he could still be of service to the community. So from 1941 to 1943 and again from 1949 to 1951, he was a member of the city council. And he served as mayor of Iowa City from 1943 to 1947, at which time he was around eighty-five years of age. He was indeed a remarkable man and a distinguished citizen. Dr. Louis C. Zopf, present Dean of the College of Pharmacy, has so very appropriately said—"Wilber Teeters contributed so much to so many lives that it is impossible to overestimate his contributions as a teacher and as an associate. He was never too busy to counsel and assist others in the problems of the community. He truly was Mr. Pharmacy and Mr. S.U.I. It will be difficult to visualize the College of Pharmacy without the presence of Dean Teeters." Dr. Harvey Davis, Provost of the University, stated in part, "To his fellow faculty members and his students, he set examples which few of us could even match, living out a fine personal and professional life with a sincere and con-

tinuing interest in learning more about the changing world in which we live. To any Iowans who have known this institution even slightly, it will be hard to imagine S.U.I. without Wilber Teeters."

Dean Teeters is survived by two sons: Dr. W. Otis Teeters of River Edge, New Jersey, and Wilber J. Teeters, Jr. of Scottsdale, Arizona.

Now let him who probably knew Dean Wilber J. Teeters best and who was intimately associated with him for more than fifty-four years add only that Dean Teeters was a remarkable man and a distinguished citizen, who numbered his friends and admirers literally by the thousands, because he dedicated himself throughout his life to the principles of honesty and the teachings of the golden rule. His honesty was truly the open smile, the firm handshake, the sincere greeting.

R. A. Kuever

HENRY MINOR FASER

The death of Henry Minor Faser in his seventy-eighth year on January 12, 1960, removed from Mississippi pharmaceutical circles a man who in his earlier years had made notable contributions to the advancement of pharmacy in that state, and who throughout his lifetime was recognized as an outstanding citizen.

Upon the founding of the School of Pharmacy of the University of Mississippi in 1908, Mr. Faser was appointed its first Dean, a post which he held for twenty years until he resigned in 1928.

He was born January 21, 1882, in Macon, Mississippi; his parents later moved to Winona, Mississippi, in which city he was reared. While attending the public schools he worked part-time in a drugstore from the age of thirteen to eighteen.

In 1900 he entered the St. Louis College of Pharmacy, graduating in 1902. In 1904 he was appointed by Governor Vardaman as a member of the Mississippi State Board of Pharmacy, serving for eight years, and being elected its president in 1912.

A charter member of the Mississippi State Pharmaceutical Association, he served as its secretary for four years and as its president in 1915. Mr. Faser is credited with being largely responsible for the enactment of laws by the Mississippi legislature raising the standards of pharmacy in that state. He also was instrumental in securing the appropriation of funds by the state legislature to erect the present Chemistry and Pharmacy Building in 1924.

In 1923 Dean Faser published a laboratory manual which was used in this and other schools of pharmacy.

In 1925 he was awarded the degree of Bachelor of Science in Pharmacy by the University of Mississippi. In 1927 Dean Faser was elected First Vice President of the American Association of Colleges of Pharmacy.

In June, 1928, he resigned the deanship and retired from pharmacy to become Associate General Agent for the Penn Mutual Life Insurance Company in Jackson, Mississippi. In 1940 he became Vice President and Agency Director of the Lamar Insurance Company of Jackson, Mississippi, a position he held until his retirement in 1952.

At the Commencement exercises of the University of Mississippi on May 30, 1954, Dean Faser was presented a citation worded as follows:

The University of Mississippi extends to Henry Minor Faser this citation as an acknowledgment of its debt and an expression of gratitude to him for twenty years of distinguished service as a member of its faculty from 1908 to 1928; as the founder and first Dean of its School of Pharmacy, which he developed through faith and conscientious effort into a fully accredited School; and as a loyal Alumnus, who after resigning from the faculty to enter private business, has worked intelligently and unselfishly for the welfare of the University.

Awarded at Commencement in the One Hundred and Sixth Year of the University, May 30, 1954. (Signed) Chancellor J. D. Williams.

Concerning this award, a Jackson, Mississippi, newspaper stated in part:

... an honor worthily bestowed upon a man who gave the best years of his life to the great educational institution in Oxford. ... The institution never had a more loyal or influential alumnus. The passing years have increased rather than diminished his love and devotion to his alma mater. . .

The high regard of alumni of the University of Mississippi for Dean Faser was further attested by his election in 1941 as president of the Alumni Association.

Dean Faser was a Mason, a Knight Templar, a Shriner, and a member of the Presbyterian Church. He also held membership in Delta Kappa Epsilon fraternity, in Kappa Psi, and in Omicron Delta Kappa, national honorary men's leadership fraternity.

He is survived by a son, Henry Minor Faser, Jr., Boston, Massachusetts, and a daughter, Mrs. Raymond Birchett, Jackson, Mississippi. Mrs. Faser preceded him in death by several years.

A. A. Dodge

NEW LITTLE PEOPLE

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Debra Ann Barr—born December 30, 1959, to Dr. and Mrs. Martin Barr, Philadelphia College of Pharmacy and Science.

Erin Kathleen O'Connell—born February 21, 1960, to Dr. and Mrs. Frank D. O'Connell, West Virginia University.

Catherine C. Cole—on September 21, 1959, became the daughter of Dr. and Mrs. Jack Cole, University of Arizona.

Frederick Eliot Chin—on October 29, 1959, became the son of Dr. and Mrs. Lincoln Chin, University of Arizona.

Philip Duncan Cross—born January 26, 1960, to Dr. and Mrs. John M. Cross, Rutgers University.

Daniel Gordon Ketcham—born October 3, 1959, to Dr. and Mrs. Roger G. Ketcham, University of California.

Ralph Frederick Shangraw, Jr.—born August 17, 1959, to Dr. and Mrs. Ralph Frederick Shangraw, University of Maryland.

Stephen Vincent Buday—born February 17, 1960, to Dr. and Mrs. Paul V. Buday, University of Rhode Island.

Joseph Gerard Webber—born January 15, 1960, to Dr. and Mrs. M. George Webber, University of Houston.

Jacqueline Carol Nichol—born December 30, 1959, to Mr. and Mrs. John T. Nichol, New England College of Pharmacy.

Andrew Michael Schwartz—born November 14, 1959, to Dr. and Mrs. Samuel Schwartz, George Washington University.

Charles Langhirt Kokoski—born February 26, 1960, to Dr. and Mrs. Charles J. Kokoski, George Washington University.

MARRIAGES

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Dr. Charles W. Blissitt, Assistant Professor of Pharmacy, West Virginia University, to Miss Gail Parker Allison, December 29, 1959.

STAFF CHANGES

NEW STAFF MEMBERS

University of California. Dr. Henry Libby, who received his Doctor of Pharmacy degree in June, 1959, from California, has been appointed assistant clinical professor of pharmacy. He replaces Dr. Adolph Kamil who had served in this capacity for one and a half years.

Washington State University. Mr. Gregory Fink has been appointed assistant professor of pharmacology effective September 16. Mr. Fink will receive his Ph.D. from the University of Utah this summer.

New England College of Pharmacy. The following people have been added to the staff on a part-time basis: Mr. Maurice L. Lurensky appointed instructor of biological sciences; Dr. C. William Nixon appointed assistant professor of biological sciences; Mr. Robert Paxinos appointed instructor of pharmacy.

Medical College of Virginia. Mr. Anthony P. Simonelli has been appointed assistant professor of pharmacy. He replaces Dr. Joseph Krezanoski. Miss Mary Jane Evans has been appointed laboratory specialist in biology.

University of Tennessee. Dr. Frederic Chang has been appointed professor of pharmacognosy. Dr. Chang is a former associate of Dr. Louis F. Fieser, Harvard University.

George Washington University. Dr. George F. Archambault, Chief Pharmacy Branch, Division of Hospitals and Pharmacy Consultant to the Surgeon General, U.S. Public Health Service; and Mr. Morris L. Yakowitz, Assistant to the Director, Division of Administrative Review, Bureau of Enforcement, Food and Drug Administration, have been appointed special lecturers in pharmacy.

University of Kentucky. Mr. Paul F. Parker has been appointed the director of pharmacy and central supply at the University Hospital, University of Kentucky Medical Center and assistant professor of pharmacy in the College of Pharmacy, University of Kentucky. Mr. Parker was formerly the director of the A.Ph.A. division of hospital pharmacy. He will be succeeded in this position by Mr. Joseph A. Oddis who is currently staff representative on the American Hospital Association's Council on Professional Practice with headquarters in Chicago.

CHANGES IN STAFF TITLES

Medical College of Virginia. Mr. Russell H. Fiske, Chief Pharmacist, Hospital Division, has been promoted from assistant professor of pharmacy to associate professor.

GENERAL NEWS

AFPE awards. The American Foundation for Pharmaceutical Education Board of Grants announced the awarding of \$133,000 for graduate fellowships for the 1960-61 year. The Board also allocated \$25,000 for undergraduate scholarships in colleges of pharmacy for the 1960-61 year. Members of the Board of Grants are: A. J. Brumbaugh; Daniel Z. Gibson; Robert Lincoln McNeil; Ernest H. Volwiler; and Ernest Little, Chairman. The graduate fellows are listed below:

Pharmacognosy

Ralph N. Blomster (Univ. of Connecticut)
Lee C. Schramm (Univ. of Connecticut)
Jack K. Wier (Univ. of Washington) Sydnor Barksdale Penick Memorial Fellowship

Pharmaceutical Chemistry

Merle E. Amundson (Mass. College of Pharmacy)
Leo W. Brown (Univ. of Washington)
Gerald A. Bruno (Purdue Univ.)
Irwin S. Butensky (Univ. of Michigan)
Lindley A. Cates, Jr. (Univ. of Colorado)
Charles S. Davis (Purdue Univ.)
Daniel W. Frascella, Jr. (Rutgers Univ.)
Allen F. Hirsch (Univ. of North Carolina)
George N. Holcomb (Purdue Univ.)
Lola V. Hopkins (North Dakota Agr. College)
Howard L. Johnson (Univ. of California)
Sidney A. Kauffman (Temple Univ.)
Donald J. Lamb (Ohio State Univ.)
Bruce D. Larson (Univ. of Michigan)
H. A. B. Dunning Citation Fellowship
Robert Lazar (Columbia Univ.)
Jack Lehrfeld (Univ. of Illinois)
Peter E. Manni (Univ. of Rhode Island)
Douglas G. Mikolasek (Univ. of Michigan)
Paul J. Niebergall (Univ. of Michigan)
Karl A. Nieforth (Purdue Univ.) Charles J. Lynn Memorial Fellowship
William C. Roemer (Purdue Univ.)
Edwin G. Scheuer, Jr. (Univ. of Rhode Island)
Mei Chen Schreiber (Purdue Univ.)
Ignatius Schumacher (Univ. of Michigan)
Stanley M. Shaw (Purdue Univ.)
Eugene N. Skiest (Univ. of Michigan)
Edward Smith (Univ. of Michigan)
James L. Spahr (Purdue Univ.)
Frederick Tishler (Univ. of Michigan)
John D. Warthen (Univ. of Maryland)
Jack N. Wells (Univ. of Michigan)
Robert A. Wiley (Univ. of California)
Henry C. Wormser (Temple Univ.)

Pharmacology

Robert E. Brummett (Oregon State Med.)
Yale Gressel (Ohio State Univ.)
Carl C. Hug, Jr. (Univ. of Michigan) Josiah Kirby Lilly Memorial Fellowship
Robert C. Lanman (Univ. of Minnesota)
E. Mead Johnson Memorial Fellowship
David A. McClure (Oregon State Med.)
Norwood R. Neumann (Purdue Univ.)
Patrick W. Ragazzino (Univ. of Connecticut)
Nick G. Strovilas (Ohio State Univ.)
Lawrence R. Weiss (Ohio State Univ.)

Pharmacy

Steven G. Bjaastad (Univ. of Washington)
Jacob Cohn (Univ. of Iowa)
Robert M. Cohen (Univ. of Connecticut)
Martin L. Eichman (Ohio State Univ.)
Gerald J. Jackson, Jr. (Univ. of Connecticut) Sydnor Barksdale Penick Memorial Fellowship
James C. King (Univ. of Texas)
John A. Lott (Rutgers Univ.)
Mark D. Mitzner (Purdue Univ.)
James C. Price (Univ. of Rhode Island)
Richard L. Sedam (Philadelphia Col. Ph. & Sc.)
Earl W. Seugling, Jr. (Ohio State Univ.)
Margaret Ann Shaw (Univ. of Florida)
William E. Smith (Univ. of Michigan)
Julian L. Stowers (Purdue Univ.)
William C. Sunkes (Purdue Univ.)
Clyde W. Whitworth (Univ. of Florida)
John Windt (Temple Univ.)
Paul E. Wray (Univ. of Wisconsin)

Manufacturing Pharmacy

James R. Harris (Purdue Univ.) Pharmaceutical Manufacturers' Association Award

Physical Pharmacy

Ernest C. Foernzler (Purdue Univ.)
Edwin T. Sugita (Purdue Univ.)
Heremii W. Wesolowski (Univ. of Iowa)

Pharmacy Administration

Raymond J. Bennett (Univ. of Wisconsin)
Charles L. Braucher (Purdue Univ.)
Vincent R. Gardner (Univ. of California)
Michael D. Jacoff (Purdue Univ.)
Hugh F. Kabat (Univ. of Colorado)
James E. Moore (Butler Univ.)
Richard A. Ohvall (Univ. of Wisconsin)
George V. Doerr Citation Fellowship
Max Polinsky (Univ. of Wisconsin)
Charles H. Walgreen Memorial Fellowship
Paul O. Williams (Univ. of Wisconsin)

Biochemistry

Lester G. Bruns (St. Louis Univ.)

Botany

Taylor E. Lindhorst (Washington Univ.)

AFPE fellowship. Dr. Thomas Werner Schwarz, Associate Professor of Pharmacy and Pharmaceutical Chemistry, University of California, received a Gustavus A. Pfeiffer Postdoctoral Memorial Research Fellowship for studies to be carried out at the Swiss Institute of Technology in Zurich.

1959 Edwin Leigh Newcomb Memorial Awards. The awards are: Undergraduate student—Arle Z. Scott, Oregon State College, School of Pharmacy, for his prize winning essay "The Effects of Gibberellic Acid on the Germination and Subsequent Growth and Alkaloid Formation in *Atropa Belladonna*"; Teacher-researcher—Dr. Gunnar Gjerstad, University of Texas, College of Pharmacy for his prize winning essay "Metabolic and Morphological Changes Induced by Gibberellic Acid on *Mentha piperita* L." Drs. Egil Ramstad, Purdue University School of Pharmacy, and Jack L. Beal, Ohio State University College of Pharmacy, received honorable mention for the essay "Mevalonic Acid as a Precursor in the Biogenesis of Digitoxigenin." The Newcomb Awards will be presented at the 1960 meeting of The American Society of Pharmacognosy. The AFPE Edwin Leigh Newcomb Memorial Awards Committee: George M. Hocking; John E. Seybert, Heber W. Youngken, Chairman.

MCV on TV. Dr. Doyl Smith, Dr. John Andrako, and Dr. Walter H. Hartung, Medical College of Virginia, recently took part in a television program on medicinal chemistry. Dean Warren E. Weaver also took part in a TV program relating to teaching careers in chemistry sponsored by the Virginia Section of the American Chemical Society.

Hartung speaks. Dr. Walter Hartung, MCV, spoke on "Experiences with Palladium Catalysts" at the recent meeting of the Virginia Section of the American Chemical Society. He was also a guest speaker at the University of Texas February 22-25.

Eby presides. Dr. Frank H. Eby, Temple University, presided at the National Professional Interfraternity Conference meeting in Chicago March 19. Dr. Eby is the first pharmacist to hold the office of president of this conference.

Sprowls on radio. At the invitation of Philadelphia Radio Commentator Frank Ford, Dean Joseph B. Sprowls, Temple University, appeared on the program "Controversy" to discuss the Kefauver investigation of the drug industry. The forty-five-minute interview took place

March 21. Dean Sprowls answered many questions phoned in by the listening audience.

Greenberg receives grant. Professor Leo Greenberg, Brooklyn College of Pharmacy microbiologist, has been given a National Science Foundation grant to attend the Institute in Desert Biology at Arizona State University from June 27 to August 5. The Institute is designed to provide a small group of college teachers of biological sciences with field experience in the desert areas of Arizona, California, and New Mexico. Many of the materials collected for study and analysis, including snake and arthropod venoms, will be used in current research programs at the Brooklyn College of Pharmacy.

Buckley receives grants. Dr. Joseph P. Buckley, University of Pittsburgh, announces the receipt of the following grants: \$2400 from Ives Cameron to study the vasodilatory properties of isorbide dinitrate and other nitrates; \$5970 from Lakeside Laboratories for cardiovascular and psychochemical research; \$3370 from U.S. Vitamin Corporation to study the pharmacology of vanillic diethylamide; and \$8050 from the National Heart Institute for the evaluation and mechanism of action of antihypertensive agents.

Colorado receives grants. Davis Brothers, Inc., drug wholesalers in Denver, will award two newly established scholarships of \$300 to students in their third, fourth, or fifth year in pharmacy.

Solomon receives fellowship. Dr. Harvey M. Solomon has been awarded a postdoctoral fellowship in pharmacology at the University of Minnesota by the Division of General Medical Sciences of the National Institutes of Health. He will study with Dr. Wallace E. White. Dr. Solomon received his M.D. at the University of Maryland.

Pharmaceutical industry contributes to medical education. The pharmaceutical industry contributed \$374,510 to the National Fund for Medical Education for 1959, according to John E. McKeen, chairman of Drug and Chemical Division of the Fund. An increase of almost \$150,000 over 1958, the drug contribution topped all others and brought the industry total to \$1,630,015 since the Division was established in 1953. The higher industry total was attributed to a rise in the number of contributing companies and to larger gifts from many of the fifty-four individual firms. Among the major firms to contribute more than \$25,000 were Johnson & Johnson, American Cyanamid Company, Eli Lilly and Company, Merck & Co., Parke, Davis & Company, Chas. Pfizer & Co., and The Upjohn Company.

Fox elected. Dr. Sereck H. Fox, Wayne State University, has been elected vice president of the Council for Basic Education, Washington, D.C. Dr. Fox is one of the founders of the Council and has served as a member of the Board of Directors since its founding.

Fox speaks. Dr. Sereck H. Fox, Wayne State University, presented an address "Legal Competition" before the Great Lakes Section of the Institute of Food Technologists in Detroit February 5.

Crandall elected. Dr. J. Verne Crandall, Wayne State University, has been elected to a three-year term on the Board of Directors of the Michigan Academy of Pharmacy.

Wilson elected. Dean Stephen Wilson, Wayne State University, has been elected President of the Michigan Branch of the A.Ph.A. He will be installed in June.

Wayne drive. The capital drive for funds for the construction of a new building for the Wayne State University College of Pharmacy is progressing well. The national campaign, which has a goal of \$500,000, has netted slightly over \$400,000. The state campaign, with a goal of \$125,000, has netted over \$67,000.

PCP awards degrees. Philadelphia College of Pharmacy and Science awarded Master of Pharmacy degrees to Mr. Gerald S. Pittman and Mr. O. K. Grettenberger at the Founders Day Convocation February 18.

PCP course. Philadelphia College of Pharmacy and Science will offer its seventh annual summer course in the preparation of parenteral products to graduates in pharmacy. The course will be held July 11-22.

Griffith reelected. Dr. Ivor Griffith has been reelected president of Philadelphia College of Pharmacy for the twentieth consecutive year.

West Virginia receives grant. The School of Pharmacy of West Virginia University has received a \$3,000 grant from the S. E. Massengill Company to provide the School with a Beckman Line Operated Spectrophotometer.

Salisbury resigns. Dr. Rupert Salisbury, Ohio State University, has resigned from the faculty to accept the position of Director of Internship and Entrance Examiner for the Ohio State Board of Pharmacy. His appointment became effective April 1.

Ohio State grant. Gray Drug Stores, Inc., has awarded a \$3,750 research grant to the Ohio State University College of Pharmacy which is to be supervised by Dr. Arthur C. Lytle, Jr., Assistant Profes-

sor of Pharmacy Administration. Mr. Howard J. King, a graduate student in pharmacy administration, will conduct the study and will be designated a Gray Drug Stores Fellow in Pharmacy Administration. The research will involve a study of prescription department inventory control procedures in a group of Columbus, Ohio stores in the Gray organization.

Ohio State grants. Kauffman-Lattimer Company has contributed \$5,000 to the Ohio State University Development Fund to establish the George Beecher Kauffman Memorial Fund for scholarships. The first scholarship of \$300 will be awarded during the academic year 1960-61 to a sophomore in the College of Pharmacy and will be renewable for two additional years. Future plans call for making a new scholarship available to a sophomore each year until three such scholarships are in existence. George Beecher Kauffman was the first dean of the College of Pharmacy and served from 1895 to 1915. He was also one of the founders of the Kauffman-Lattimer Company in Columbus in 1881. The Kauffman-Lattimer Company is to support the George Beecher Kauffman Lecture Series during the 1960-61 school year which will highlight the observance of the seventy-fifth anniversary of the Ohio State University College of Pharmacy. Under this program outstanding leaders in pharmaceutical education and practice, science, and industry will be brought to the College as visiting lecturers during the year to supplement the regular program of instruction.

The Ohio State University Development Fund has given \$7,700 to the College of Pharmacy for the following: A grant to Dr. John W. Nelson and Dr. Arthur Tye for a study on the gastrointestinal absorption of drugs; a grant to the pharmacology department for the purchase of equipment for measuring the effect of psychotropic drugs on animal behavior; a grant to Dr. David Guttman to study interactions of uracil derivatives with proteins; a grant to Dr. Jules LaPidus to study intramolecular enamine condensations.

Dr. Jules LaPidus, College of Pharmacy, and Dr. Frank Fisk and Dr. Ralph Davidson, Entomology Department, Ohio State University, have received a \$29,151 NIH grant to study chemical factors in host plant selection by insects.

Sonnedecker speaks. Dr. Glenn Sonnedecker, Director, American Institute of the History of Pharmacy, delivered the principal address April 30 at the annual meeting of the Ohio Academy for Medical History in Columbus, Ohio. Dr. Sonnedecker spoke on "The Ohio State University College of Pharmacy During Seventy-Five Years."

Kupchan speaks. Dr. S. Morris Kupchan, University of Wisconsin, February 12 was an invited speaker at the Plant Chemists' Conference, Columbia University. He spoke on "The Structure of the Desacetylprotoveratrine."

Swinyard to Wisconsin. Dr. Ewart A. Swinyard, University of Utah, was the University of Wisconsin Rennebohm Lecturer March 24 and 25. His topics were "Drugs: From Animals to Man," and "Experimental Seizures and Research." The Rennebohm Lectures, supported by a grant from the Oscar Rennebohm Foundation, each year bring to the Madison campus an outstanding scientist in some area of pharmacy.

Higuchi speaks. Dr. Takeru Higuchi, University of Wisconsin, who is chairman of the Wisconsin Section of the American Chemical Society, recently spoke to the Iowa Section of the ACS on the kinetics and mechanisms of the deterioration of drugs.

Bonow speaks. Dr. Eunice R. Bonow, University of Wisconsin—Milwaukee, recently addressed the Soroptimists International of Milwaukee on the subject "A History of Pharmacy as Reflected in the Treatment of Wounds."

Rutgers dedicates. Rutgers University College of Pharmacy on March 24 dedicated its new radioisotopes laboratory. Executives from numerous pharmaceutical and chemical companies attended. Speakers included Dr. Paul E. Aebersold, Director of the Office of Isotopes Development of the U.S. Atomic Energy Commission.

Texas lectures. The third annual visiting lecture series was presented this year at the University of Texas. The lecturers were: Dr. Glenn Sonnedecker, Director of the American Institute of the History of Pharmacy; Mr. Max N. Lemberger, Retail Pharmacist, Milwaukee, Wisconsin; Dr. Martin Barr, Professor of Pharmacy, Philadelphia College of Pharmacy; Dr. Richard Schultes, Professor of Economic Botany and Curator of the Herbarium of Economic Botany, Harvard University; Dr. C. Jelleff Carr, Psychopharmacology Research Center, National Institute of Mental Health; Dr. Justin L. Powers, Editor of the *Scientific Edition, J.A.Ph.A.* Each lecturer delivered three lectures.

Milano honored. Professor Benjamin L. Milano, Brooklyn College of Pharmacy, was honored by the school's alumni association at its second annual Faculty Night which is held to pay tribute to a distinguished member of the teaching staff for dedicated service to the College. Professor Milano is a veteran of forty years of teaching.

New Texas journal. Succeeding *The Longhorn Pharmacist*, edited by University of Texas College of Pharmacy students, will be the *Texas Journal of Pharmacy*, edited by Dean Henry Burlage.

New textbook. A new textbook *Pharmaceutical and Medical Latin* by W. F. Gidley and Joseph R. Moreno is just off the press. The senior author is Dean Emeritus William F. Gidley of the University of Texas College of Pharmacy, and the junior author, Joseph R. Moreno, is a special instructor in the College.

California visiting professor. Dr. Hideo Takenaka, Professor of Pharmacy, Gifu College, Gifu, Japan, was appointed visiting professor of pharmacy for three months (November to February). He has been studying pharmaceutical education in the United States and now is touring several pharmaceutical houses in Europe.

Fellow at California. Mr. Jorge Medina A., Chemical Analyst, Syntex Corporation, Mexico City, has been awarded a United Nations Fellowship for six months to study quality control in the pharmaceutical and chemical industry under the direction of Dr. Einar Brochmann-Hanssen.

Speakers at California. Dean Louis C. Zopf, State University of Iowa, participated in the postgraduate seminar, "Dermatology for Pharmacists" January 21 and 22 at the University of California. He spoke on the effect of drugs on the skin and the influence of vehicles on the availability of medication applied to the skin.

Dr. Hans Hellberg, Director of the National Pharmaceutical Laboratory of Sweden, was guest speaker at the University of California College of Pharmacy student body meeting December 11. His topic was "Drugs and Drug Control in Sweden."

California NIH grants. The University of California recently received three NIH grants. These were to Dr. Einar Brochmann-Hanssen (\$14,491) for studies on opium and the opium poppy, to Dr. Donald C. Brodie (\$5,399) for a study of the mechanism of action of epinephrine on smooth muscle, and to Dr. E. Leong Way (\$21,275) to continue his study of the physiologic disposition of amines of therapeutic interest and to correlate such findings with the pharmacologic effects of the compounds.

Schwartz appointed. Dr. Charles Schwartz has been appointed a consultant by the Frontiers of Science Foundation of Oklahoma. In this capacity he will speak to various civic groups concerning science, particularly regarding the methods of improving the over-all science program of the state.

Miller returns. Dr. Francis M. Miller, University of Maryland, has returned after spending a sabbatical leave in Germany.

Purdum to Burroughs. Dr. W. Arthur Purdum, University of Maryland, who has been professor of hospital pharmacy since 1947, has been named vice president in charge of production and development of Burroughs Brothers Manufacturing Company.

Pumpian named. Paul A. Pumpian, Secretary of the Wisconsin Board of Pharmacy, has been appointed Midwestern States Regional Chairman of the Greater University of Maryland Fund. Pumpian is a former staff member of the University of Maryland School of Pharmacy. As regional chairman he will be responsible for the organization of committees to solicit funds from the University's 1100 alumni in eleven of the midwestern states.

Houston grants. The University of Houston College of Pharmacy received two grants in January, totaling \$17,500, from the Clayton Foundation for Research: \$9100 to Dean N. M. Ferguson for a spectrophotometer, and \$8400 to Dr. Robert L. Boblitt to support research in pharmaceutical research.

Arkansas receives award. A \$3500 award has been made to the School of Pharmacy by the Smith Kline & French Foundation to purchase research equipment.

Lloyd resigns. Dr. W. R. Lloyd, University of Texas, has resigned from the pharmacy faculty to become director of product development of the Texas Pharmaceutical Company, San Antonio, Texas. He will begin his duties July 1.

Rowland elected. Dean I. W. Rowland, College of the Pacific, was elected Grand President of Phi Delta Chi for the third consecutive term at the fraternity's convention in Atlanta, Georgia, December 27-30.

Greenberg receives grant. Professor Leo Greenberg, Brooklyn College of Pharmacy Microbiology Department, received a grant from the Tailby-Neson Division of International Latex Corporation for a comparative evaluation of the effectiveness of commercial products used in the treatment of seborrheic dermatitis.

Tyler to Germany. Dr. Varro E. Tyler, Jr., University of Washington, will give a paper entitled "Protoalkaloids of *Panaeolus* Species" at the second symposium on the biochemistry and physiology of alkaloids at Halle, Germany. The symposium begins May 21. Dr. Tyler also attended the first symposium. After the symposium Dr. Tyler will visit several laboratories in Europe.

Bliven honored. Dean Charles W. Bliven, George Washington School of Pharmacy, President of the AACP, was honored for "the spirit of scholarship and in recognition of his outstanding contributions to pharmacy both on local and national levels" by Pi Chapter of Alpha Zeta Omega Pharmaceutical Fraternity at their Eighth Annual Scholarship Award Dinner November 19.

Rowe elected. Dean Tom D. Rowe, University of Michigan, was elected a Fellow of the American College of Apothecaries at the annual meeting of the College in Bal Harbour, Florida.

Auburn receives grant. The Auburn University School of Pharmacy has received an unrestricted grant of \$5000 from the Smith Kline & French Foundation.

Principe at Connecticut. Mr. Joseph R. Principe, a graduate of Massachusetts College of Pharmacy, assumed teaching duties in the area of pharmacy administration at the University of Connecticut beginning the second semester. He replaces Mr. Raymond J. Dauphinais who assumed directorship of the new legal division of the A.Ph.A.

Connecticut grants. A number of grants have been made to members of the staff of the University of Connecticut School of Pharmacy. Dr. Arthur E. Schwarting has received the fifth annual renewal of a grant from the Atomic Energy Commission. The sum of \$4700 was received for the study of ergot alkaloid metabolism. Dr. Schwarting has received a NIH grant of \$2800 for three years for the study of fermentation production of alkaloids, and he has also received a U.S. Army Chemical Warfare grant of \$12,000 for the investigation of *Withania* alkaloids.

The Atomic Energy Commission has made a joint grant of \$14,090 to Dr. Donald M. Skauen of the School of Pharmacy and Dr. John S. Rankin, Jr., Director of the Marine Research Institute of the University of Connecticut. This award is to provide for a study of the zinc-65 level in various marine organisms in the Fishers Island region. These two investigators have also received a National Institute of Health Grant of \$12,439 for a survey of gross radioactivity in water sediment and organisms in the Fishers Island region of Long Island Sound and its estuaries.

Dr. Richard K. Thoms has received for the fifth year a Fesler Company grant for \$7000 to study local anti-infectives.

Washington State receives grant. Washington State University School of Pharmacy recently received an unrestricted grant of \$5,000 from the Smith Kline & French Foundation.

SKF films. Smith Kline & French Laboratories recently announced a new medical teaching film program to be conducted on a regular, continuing basis. Each year this program will produce two teaching films especially designed to fill needs in audio-visual medical education. The films will be produced under the professional direction of distinguished medical leaders and will contain no product references of any kind. Two films previously released by SK & F, "Human Gastric Function" and "Recognition and Management of Respiratory Acidosis," will be included in the new series. The films are obtainable on loan from the SK & F Film Center.

Medical research. The Association of American Medical Colleges recently announced that for the 1957-58 year expenditures for separately budgeted research in medical schools in this country amounted to \$105.5 million. Of this amount \$51.3 million was from NIH, \$13.6 million from other federal sources, and \$40.6 from non-federal sources. This represents an increase of 133 per cent over the 1953-54 figure.

Purdue symposium. A two-day symposium on the use of radioisotopes in the pharmaceutical and allied industries, followed by a four-week course was offered by Purdue University starting April 25. The program was planned by the Bionucleonics Department of the University with the cooperation of the Office of Isotopes Development of the U.S. Atomic Energy Commission. The course was designed to acquaint technical personnel with radioisotopes so that they may use them safely and efficiently in pharmaceutical research, control, and production.

SK & F information book. Smith Kline & French recently released to 53,000 retail pharmacies a product information book containing overdosage information, extensive pharmacology and other technical data on every SK & F product. Mr. Frazier Cheston, Director of Distribution, said the unusual reference manual was mailed to all retail pharmacies because "it is becoming readily apparent that the pharmacist is the one man whose training, experience, and intimate knowledge of an ever-growing list of ethical products qualifies him to serve as professional drug consultant to practicing physicians."

Fordham broadcasts. The College of Pharmacy of the Fordham University participated in two radio programs in the last few months. Dr. Bernard Grabowski discussed "Chemistry in Pharmacy" on the first program, and students of Rho Chi broadcast a panel discussion on "The Science of Pharmacy" on the second program.

Caldwell studies plants. Dr. Mary E. Caldwell, University of Arizona pharmacologist, has recently received a \$4000 grant from the Elsa U. Pardee Foundation of Midland, Michigan for continuing studies on the antitumor properties of native plants used as medicine by southwestern Indians and Mexicans. The study was supported last year by gifts from an anonymous donor and the Alumni Association of the University. Some 500 different species have been collected and subjected to laboratory procedures. About 900 plant extracts have been submitted to the National Cancer Institute for their screening procedures.

Florida receives grant. The Atomic Energy Commission has awarded the University of Florida College of Pharmacy \$5700 to supplement a previous grant for buying equipment.

Sica elected. Dean Albert J. Sica, Fordham University, was elected to a second term as President of the New York Branch of the A.Ph.A.

California postgraduate course. (*Editor's Note: Space does not permit the publication of details of the many programs of postgraduate courses received; however, the topics outlined here for the University of California program seem to illustrate an outstanding program.*) The postgraduate course entitled "Dermatology for Pharmacists" was offered by the School of Pharmacy of the University of California with the cooperation of the School of Medicine January 21 and 22. The following topics were presented: "Structure and Function of the Skin"; "Pharmaceutical Aspects of Dermatology: The Effect of Drugs on the Skin"; "The Influence of Vehicles on the Availability of Medication Applied to the Skin"; "Bacterial and Viral Diseases of the Skin"; "Fungus Infections and Their Treatment"; "The Scalp in Health and Disease"; "Panel: Sunburn, Prevention, and Treatment"; "Presentation of Clinical Patients"; "Teen-age Skin Disorders"; "Topical Corticosteroid Therapy"; "Poison Oak Dermatitis"; "Drug Sensitivity."

Brooklyn tests. After working together for six years on the development of tests to identify and select those who would be most suited to careers in pharmacy, the Brooklyn College of Pharmacy and the Psychological Corporation have completed a first battery of tests which were given April 23 as part of the admission requirements for entering students. The results of the tests, used in conjunction with information about the applicant's motivation and past academic record, will be used to predict achievement levels in the five year program at BCP.

SK & F sets up medical fellowship program. The Association of American Medical Colleges recently announced the grant of \$180,000 by Smith Kline & French Laboratories to provide a three-year program designed to further medical education by sending future doctors to remote areas of the world. The fellowships are open to all medical college students who have completed their third year of study. The program will permit an average of thirty student to participate each year. Eligible students should be prepared to spend an average of twelve weeks working in foreign locales. The program will begin this summer.

Arizona study. The Board of Regents of the Universities and State College of Arizona recently appointed Dr. Joseph F. Volker, Director of Research and Graduate Study of the University of Alabama Medical Center, to head the Medical School Study to determine the state's need for a college of medicine. The Study will be supported by a \$135,000 grant from The Commonwealth Fund.

Blicke honored. On April 9, faculty and alumni of the University of Michigan honored Dr. Frederick F. Blicke who will begin his retirement furlough in June. Dr. Blicke went to the University of Michigan in 1921 and joined the College of Pharmacy in 1926. He holds the rank of professor of pharmaceutical chemistry. Dr. Blicke is internationally known for his research on synthetic medicinals, chiefly diuretics and anti-spasmodics. Sixty-seven students have won doctoral degrees under Dr. Blicke's guidance. In 1957 Dr. Blicke received the university's Distinguished Faculty Award. Last November he was named Henry Russell Lecturer, the highest honor the University of Michigan can give a faculty member. Dr. Blicke was born April 26, 1891, attended Culver Military Academy, Ohio State University, the University of Michigan, and the Technical Hochschule in Berlin, Germany.

ICRS journal. Schools and individuals interested in current research reports on medical and pharmaceutical work being done in the Soviet Union will want to subscribe to the *I.C.R.S. Medical Reports* which is published as a service by the Institute of Contemporary Russian Studies, Fordham University, New York 58, New York. The subscription is \$10 a year.

VA internship. Candidates for Veterans Administration pharmacy internships and residencies are no longer required to file through a Civil Service examination, but may apply directly to the personnel offices of the VA hospitals offering the training.

Internships in pharmacy are offered by the VA hospitals at Hines, Ill. (in the Chicago suburbs) and at First Avenue at East 24th Street, New York 10, N.Y.

Pharmacy residencies are offered by the VA hospitals at Hines and at Indianapolis, Iowa City, Los Angeles, Pittsburgh, Minneapolis, St. Louis, and Seattle.

The new application procedure is expected to speed acceptance of qualified candidates, the VA said.

Pharmacy interns must be college graduates but are not required to be registered pharmacists. They receive pay at the rate of \$1.95 per hour. Those in the upper 25 per cent of their class are eligible to receive \$2.16 an hour.

Pharmacy residents must be registered pharmacists working toward an advanced degree. They are paid at the rate of \$2.40 per hour.

Pharmacy students are invited to visit VA hospitals to observe the operation of the pharmacy services and of the hospitals. They also may secure further information on the internships and residencies by visiting the hospitals.

AAAS Pharmacy Section meeting. Pharmacy Section Np held eight sessions December 26 through December 29 in Chicago, Illinois. A total of forty-eight contributed papers on various studies was reported, and one symposium was held. Over 300 persons registered as having attended one or more of the pharmacy section meetings.

The AAAS Council, the governing body of the Association, elected Dr. Joseph Swintosky, Research Division of Smith Kline & French Laboratories, Philadelphia, Pennsylvania, as a Vice-President of the Association and elected Dr. Don E. Francke, University Hospital, University of Michigan, to serve on the Committee-at-Large of the Section for a four-year term. Dr. Swintosky will serve as chairman of the section for the coming year and will preside at the Philadelphia meeting in December, 1960.

Of major interest to the group in attendance was a most stimulating vice-presidential address on "Professionalism and the Pharmaceutical Scientist" presented by Dean Glenn L. Jenkins. A symposium entitled "The Scientist's Part in Protection of the Public, Part I: Food, Drug, Cosmetic and Hazardous Chemical Problems and Part II: Food Additive Legislation," also attracted considerable interest, not only on the part of the pharmaceutical scientists in attendance, but also by many individuals from other scientific disciplines. Dr. Joseph Swintosky and Dean Glenn L. Jenkins gave introductory remarks and served as presiding officers over the ses-

sions. Dr. Bernard E. Conley, Secretary of the Committee on Toxicology of the American Medical Association, gave a discussion of the labeling of hazardous chemicals. Dr. William F. Bousquet, Assistant Professor of Bionucleonics at Purdue University, presented the problems of pharmaceutical ingredients legislation and approaches to solving them. Dr. Bousquet emphasized the importance of radioisotope techniques in studying food and drug residues and formed metabolites. The role of the cosmetic scientist in protecting the public health was covered by Raymond E. Reed, Vice President of the Toni Company. Dr. John H. Rust, Head of the Section on Nuclear Medicine at the University of Chicago, spoke on the applications of radioactive isotope tracer techniques to studying the food additive problem. He emphasized the need for education in isotope tracer techniques to supply trained personnel for food research now necessary under present food additive legislation. Problems in evaluating the safety of intentional food additives and unintentional food additives were set forth by Dr. O. Garth Fitzhugh, Chief of the Toxicity Branch of the Food and Drug Administration, and Dr. Arnold J. Lehman, Director of the Division of Pharmacology of the Food and Drug Administration, respectively. Dr. Edward J. Matson, Director of Scientific Administration for Abbott Laboratories, explored the philosophical question of scientific judgment in law and regulation. He emphasized the need for sound scientific judgment based on known facts in arriving at conclusions regarding levels of toxic and carcinogenic substances in foods for human consumption. The role of the scientific expert under recent food laws was summarized by Bernard L. Oser, President of Food and Drug Research Laboratories, Inc. The symposium was terminated with an hour-long question and answer session on current food, drug, and cosmetic problems.

In addition to the above-mentioned program, the hospital pharmacy group had a most informative and well-attended full-day session under the guidance of Dr. George F. Archambault and Joseph A. Oddis. The meeting was held in the recently-completed facilities of the American Hospital Association. The following organizations were represented: American Society of Hospital Pharmacists, American Pharmaceutical Association, Illinois Society of Hospital Pharmacists, American Hospital Association, National Association of Boards of Pharmacy, U.S. Public Health Service, Illinois Hospital Association, and the National Institutes of Health. Luncheon, entertainment and dinner were sponsored by E. R. Squibb & Sons, Mead

Johnson and Company, and McKesson and Robbins, Inc., respectively.

Professor George L. Webster, Dean, College of Pharmacy, University of Illinois, opened the contributed paper sessions which consisted of the presentation of the results of original investigations. Egil Ramstad and co-workers at Purdue University presented a series of six papers describing work done on plant biogenesis and metabolism using radioactive tracer techniques. C. T. Peng, University of California, discussed quenching of fluorescence in liquid scintillation counting and in a second paper the fate of tumor implants in rats. The distribution of C-14 Meprobamate in rat brain was discussed by J. L. Emmerson, T. S. Miya, and G. K. W. Yim of the Pharmacology Department, Purdue University. Herbert Schriftman, Wyeth Laboratories, spoke of the applications of paper chromatography and electrophoresis to the assay of pharmaceutical products. An improved 4 pi, whole body liquid scintillation counter was described by B. G. Dunavant, and J. E. Christian of the Bionucleonics Department at Purdue University; and J. P. Vacik and J. E. Christian from the same department described the application of neutron activation analysis to the microanalysis of gold containing pharmaceuticals. G. Levy, University of Buffalo, described the physical-chemical basis of the buffered aspirin controversy; D. E. Guttman, Ohio State University, discussed the solubilization of riboflavin; J. Autian, University of Michigan, discussed the binding of drugs by plastics; and M. L. Eichmann, Ohio State University, presented information concerning the interactions of xanthine molecules with serum albumin.

Other papers presented were "Methods of Synthesis of Tetrahydroquinolinium Salts," "Color-Coding of Drug Dosage Forms," "Hydration of Procaine Base," "Evaluation of Suppository Bases," "The Social Psychology of Prescription Writing," "Effects of Physostigmine on Chick Eggs," "Pharmacological Prevention of Acute Heart Failure," and "Spray-drying of Tablet Granulations." These papers were delivered by D. M. Stuart, Oregon State College; R. G. Brown, University of Texas; W. A. Strickland, Jr., University of Arkansas; J. Ansel, Warner-Lambert Research Institute; E. J. W. Hall, University of Texas; V. A. Green, University of Texas; J. W. Ingalls, Jr., Long Island University; and A. M. Raff, Smith Kline & French Laboratories, respectively.

This meeting proved to be one of the most successful meetings of Section Np of the AAAS in recent years and was exceedingly well attended.

BOOK REVIEWS

May's Chemistry of Synthetic Drugs, G. Malcom Dyson. Fifth Edition. Longmans, Green and Co., Inc., New York 18, New York, 1959. vii + 678 pp., 29 figs., 96 tbls. \$22.50.

A whole new generation of pharmaceutical chemists has been developed since the Fourth Edition of this book was published in 1939. To the young man in the field, the appearance of a Fifth Edition of a book he has never seen in the Fourth Edition will be a surprise. To the older generation, the publication of this edition will be a shock like that caused by seeing an old friend long thought to be dead. All of us will be pardoned, I am sure, if we suspect that the similarity between the two editions lies solely in the title.

The publishers and the elder author, Dr. Percy May, are indeed fortunate to have found such a capable and distinguished scientist as Dr. Dyson to assume the responsibility of completely rewriting this British publication. Even with the consultative help of the previous author, it must have been a most wearing task for the new author to have completed his responsibility in the face of the tremendous breadth of modern research developments in synthetic drugs. If a large American sale is hoped for, the exceedingly high price of this book and competition from comparable domestic texts undoubtedly will lead to disappointment.

In keeping with modern developments, the subject matter in this book is arranged according to a pharmacological classification. However, emphasis is placed on the chemistry of the compounds. Liberal use has been made of structural formulas, and synthetic procedures for many of the more common compounds are illustrated and appropriate references given. Information on the biological effects of the compounds is just sufficient to provide a basis for brief structure-activity relationship discussions. The advanced graduate student and research worker will find this a disappointing feature of the book. In depth and breadth, the presentation of theory is more suited for the student just becoming acquainted with the ideas of structure-activity relationships. A useful feature of the book is the lengthy list of references at the end of each chapter although there are very few citations to literature of a date later than 1955. Certainly greater value will be found in the brief historical background of the development of the various classes of medicinal agents that this book gives than in using it as a source of information on recent developments. For example, the chap-

ter on diuretics has no information on the benzothiadiazines; the chapter on morphine-type analgesics has no information on the development of the benzazocines; the chapter on adrenergic drugs makes no reference to monoamine oxidase inhibitors; the chapter on sedatives and hypnotics includes a limited amount of material on tranquilizers.

The first three chapters introduce the reader to a review of important theories and ideas related to the development of synthetic drugs: the mode of action of drugs, metabolism of drugs and structural-activity relationships. In the next twenty-seven chapters the following classes of compounds are dealt with: general anesthetics, local anesthetics, sedatives and hypnotics, antipyretics and analgesics, analeptics, adrenergics, adrenergic blockers, cholinergics, anticholinergics, antihistamines, anticonvulsants, circulatory-cardiovascular drugs, diuretics, coagulants, anticoagulants and quasi-mechanical drugs, drugs affecting the digestive tract, thyroxine and antithyroid drugs, antimitotic drugs and carcinogens, vitamins, hormones and steroid substances, general antiseptics, sulfonamides, organo-metallic compounds, trypanocides, anthelmintics and other antiparasitic drugs, antituberculars and antileprotic drugs, and antibiotics.

The reviewer anticipates finding this book of value as a reliable source for the structure of many drugs. The many tables that provide information on the comparable physiological activity of similar drugs also will be helpful. It will be a ready reference for finding literature citations for the syntheses of many important compounds. It is not anticipated that this book will enjoy any popularity in this country as a text for either undergraduate or graduate courses in organic pharmaceutical chemistry.

Allen I. White
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The Alkaloids: Chemistry and Physiology, Volume VI, R. H. F. Manske, Editor. Academic Press Inc., New York, New York, 1960. xii + 442 pp. \$14.00.

This book, which is described as a supplement to Volumes I and II of the series, consists of nine chapters: 1. "Alkaloids in the Plant" by K. Mothes, 2. "The Pyrrolidine Alkaloids" by L. Marion, 3. "Senecio Alkaloids" by N. J. Leonard, 4. "The Pyridine Alkaloids" by L. Marion, 5. "The Tropane Alkaloids" by G. Fodor, 6. "The Strychnos Alkaloids" by J. B. Hendrickson, 7. "The Morphine Alkaloids" by G. Stork, 8. "Colchicine and Related Compounds," and 9. "Alkaloids

of the Amaryllidaceae," both by W. C. Wildman. This mere listing of the authors' names is sufficient to indicate to the informed reader that the contents of this volume measure up to the high standards of accuracy and quality of information established in the first five volumes of "Manske's Alkaloids."

In spite of the designation as a supplement to Volumes I and II, the present work does not cover all of the topics to which chapters are devoted in those volumes. Failure to report advances in the chemistry and physiology of the indole alkaloids and the *Erythrina* alkaloids would at first appear as very serious omissions, but advertising matter recently received from the publisher, although not accompanying the review volume, indicates that these topics will be considered in Volume VII. Nowhere in Volume VI is it specifically designated as a partial supplement to Volume II, and persons interested only in specific sections should take note. One regrettable omission remains. The editor has not updated his own chapter in Volume I on sources of alkaloids and their isolation, although some excellent contributions to the periodical literature, such as that of Willman and Schubert, have been made in the interim.

Although supplements, by their very nature, are never completely satisfactory to use, their publication for works of this type will probably become more frequent as a result of economic pressures. Future compilers of supplements will gain much by a study of this book. Included at the bottom of key pages throughout the text will be found a listing of original volume and page numbers which the new material supplements. A table of contents of the first five volumes is also added as an aid to the reader.

The length of time between completion of the manuscripts and appearance of the printed book appears to have been unduly long for this volume. Very few references more recent than 1957 will be found, except in a reference addendum appended to Leonard's chapter on the *Senecio* alkaloids. Although useful, once located, these additional references are naturally not numbered in the text and their inclusion makes one wonder just how far the supplement to a supplement idea should be stretched.

In most, but not all, of the chapters the numbering of structures in Roman numerals is continued from the earlier volumes, resulting in such impractical designations as CCCLXXXVIII toward the close of the morphine chapter. Although this may be immediately intelligible to pharmacists and those mathematicians who keep in practice by reading the dates on motion picture films which are expressed in this archaic system to hinder recognition, it was to avoid just such situations that the use of Arabic numerals was adopted many years ago. There comes a time when uniformity should be

sacrificed in the interest of facility and intelligibility.

A point of contention long held by this reviewer with the entire series *The Alkaloids* is the use of the subtitle *Chemistry and Physiology*. Coverage of the chemistry of alkaloids has been generally excellent and continues to be in this supplement, but the brief chapter on alkaloids in the plant, competently written by James in Volume I and exceptionally well supplemented by Mothes in Volume VI, is insufficient to give the entire series much of a physiological flavor. An example of this type of unilateral chemical coverage is seen in the opening lines of Stork's chapter on the morphine alkaloids: "The outstanding developments of the few years since the appearance of Volume II of this series (in 1952) have been mainly synthetic. . . ." This statement is not true if one considers both the chemistry and physiology of the morphine alkaloids. Although it is true that the really definitive works on morphine biosynthesis by Kleinschmidt and Mothes and by Leete appeared during that protracted period in which the present volume was in press, much important work of a physiological nature appeared in the specified interim. The biosynthetic preparation of radio-active morphine by Geiling *et al.*, the selection of high yielding chemical strains of *Papaver somniferum* by Lecat, and observations on the influence of photoperiodicity and thermoperiodicity on morphine production in the poppy by Mika are just a few of the many noteworthy studies which should be mentioned in any work purporting to review progress in the chemistry and physiology of the morphine alkaloids. The selection of this chapter as an example does not imply that the coverage in it is much different from that accorded to physiological studies in other chapters or volumes. Rather, it is typical of the cursory treatment given this phase of alkaloid investigation in the entire series. There are exceptions. Wildman's colchicine chapter in Volume VI is an example of better balanced coverage. Still, a volume in English devoted to the biological phases of alkaloid investigation is sorely needed to supplement and render still more useful this excellent compendium of chemical knowledge.

This reviewer would find little to criticize if the editor had chosen to omit the word physiology from the subtitle of this *magnum opus*. It continues to be the only authoritative work on the subject in the English language which makes any pretext at being kept up-to-date. Volume VI deserves a prominent place on the bookshelves of every scientific investigator with even a remote interest in its fascinating subject matter and has probably already found such a position in all libraries attempting to serve the needs of such individuals.

Varro E. Tyler, Jr.
University of Washington

The CIBA Collection of Medical Illustrations, Volume 3, A Compilation of Paintings on the Normal and Pathologic Anatomy of the Digestive System, Part I, Upper Digestive Tract, Frank H. Netter. First Edition. CIBA, Summit, New Jersey, 1959. ix + 206 pp., 172 plates. \$12.50.

This is the second of three parts portraying the anatomy and pathology of the digestive system. Part III, portraying the liver, biliary tract and pancreas, appeared in 1957. Part II, dealing with the lower digestive tract, is in preparation and is to be published in 1961. The material covered in Part I, portrays, in the inimitable and well-known style of Dr. Netter, the anatomy of the mouth and pharynx, esophagus, stomach and duodenum, functional and diagnostic aspects of the upper digestive tract, and presents illustrative examples of the more common pathological involvements of each of the regions or structures concerned. Accompanying each of the magnificently colored plates, and for each of the regions concerned, there is a brief, concise and interesting presentation of the correlation of structure and function of the structures portrayed. The explanatory material for each of the plates has been prepared in cooperation with individuals who are experts in their particular field. The names of Bachrach, Huber, Michels, Mitchell, Nessen, Som, Stern, Wolf, and Wolf-Heidegger, authorities in basic sciences and in the clinic, certify the competence of the textual material.

The artists and editors concerned in the preparation of the CIBA Collection of Medical Illustrations have not been concerned with presenting completeness in detail. The present volume follows this general principle; it is intended to supplement standard reference works. The graphic material presented in this volume (as well as in previous volumes of this series) is available in the form of slides for projection which may be used at the discretion or interest of any teacher or student group. Of considerable interest and importance are the efforts made to present not only the gross anatomy but also pertinent histological and radiological illustrative materials. Concluding the text of the volume are six pages of recent references which may be consulted by students interested in further exploration of particular subject matter. Examination and study of this, or of any volume of this series, is an educational experience for students of whatever discipline. The reviewer recommends it highly as an instructive and intelligently constructed aid to the study of anatomy, physiology, and pathology.

William O. Reinhardt
University of California

Safe Handling of Radioactive Isotopes in Medical Practice, Edith H. Quimby. The Macmillan Company, New York, 1960. xii + 97 pp., 8 appendices. \$4.50.

The author states in the preface that her aim in writing this book has not been to provide a complete manual on radiation safety but rather to give basic information which will supply answers to questions as to the reasons for various procedures, supplement the instructions of the radiation protection officer, and give the radiation worker a feeling of assurance that he can meet non-routine situations if they arise. The book is written for technicians, nurses, doctors, or anyone else engaged in radioisotope work in a hospital or medical practice.

The first twenty-five pages consist of background information on modern physics, the medical use of radioactive isotopes, and possible radiation hazards.

Chapter IV, "Maximum Permissible Doses—Monitoring," is so brief (ten pages) as to constitute an introduction to the various equipment available rather than to supply a working knowledge.

Chapter V, entitled "Precautions in the Hot Laboratory" is the necessary basic information which should be at the disposal of all radioisotope workers. The reader is here advised to take advantage of the author's experience rather than learning this material the hard way through experience.

The next chapter covers completely the precautions to be taken within the hospital. There is considerable excellent practical information in this chapter which is marred only by the failure to mention the necessity for a routine leak test of sealed sources of radioactivity. The succeeding chapters deal with radioactive contamination and the disposal of radioactive waste. The appendices contain considerable practical information on various forms, nursing notes, instruction sheets, etc. This can be of considerable value particularly to those wishing to initiate a clinical radioisotope unit.

In summary, this book will be of value to anyone involved in the medical use of radioisotopes. It is especially useful for a physician about to venture into this field. Most of the material can be found in the handbooks of the National Bureau of Standards. The book will also simplify the task of the hospital radiation protection officer by permitting him to place in the hands of a radioisotope worker a concise, accurate, and easily read book on radiation protection.

Arthur J. Solari
University of Michigan

A Laboratory Manual for Pharmacology:

W. A. Teppert and James R. Weeks. First Edition. College of Pharmacy, Drake University, Des Moines 11, Iowa. 1959. ix + 134 pp. 5 figs., 27 forms, 9 tpls. \$4.00.

This laboratory manual contains twenty-three experiments which demonstrate pharmacological principles, various drug actions, and the experimental method in an excellent manner.

The object, the general significance, and background for each experiment are presented. Procedures are clearly written with tables available for recording results. Areas covered include factors influencing drug actions, statistical analysis of data, biological assays, hypnotics, anesthetics, anticonvulsants, CNS stimulants, analgesics and antipyretics, antihistaminics, diuretics and antidiuresis, and drugs influencing the autonomic nervous system and cardiovascular system. In addition, isolated tissue experiments on intestines, tracheal chain, and heart are included. In the majority of the experiments, the rat, mouse, and rabbit serve as the experimental animals; though the pigeon, guinea pig or dog is required for a few experiments.

The choice of experiments is good with only the Langendorff heart preparation planned as a demonstration. Important areas not covered include hormones, blood coagulation, anti-infectives, cardiac glycosides, and antifibrillatory agents.

The reviewer recommends this pharmacy laboratory manual as one that is well organized, well written, and practical. Performance of these experiments should provide the pharmacy student with a broad experience in the laboratory and an increased appreciation of the laboratory experiment as a source of information.

Robert A. Woodbury
University of Tennessee

Emergency Treatment and Management,

Thomas Flint, Jr. Second Edition. W. B. Saunders Company, Philadelphia, Pennsylvania. 1958. xvii + 539 pp., 20 tpls. \$8.00.

A condensed, well-organized, cross-indexed, pocket-sized book, covering general medical preparations, procedures, and many emergencies including overdoses of drugs and poisons, injuries, bites, infections, and pediatric emergencies. Symptoms, treatment, prognosis, and frequently preparations which may contain the chemical substances are listed. Toxic ingredients of approximately 2500 household, commercial, and wholesale preparations are given. This book should prove to be very useful to the pharmacist who operates the neighborhood drugstore.

Robert A. Woodbury
University of Tennessee

Physical Pharmacy, Alfred N. Martin.

Lea and Febiger, Philadelphia, Pennsylvania, 1960. 692 pp., 168 illus., 108 tpls. \$15.00.

This book attempts to unite the theory and practice of the pharmaceutical sciences for the student in the physical pharmacy course. It attempts to show how these principles can be made more meaningful to students and how they can be applied to pharmaceutical compounding and product development.

The subject matter in this volume does not presume that the student previously has had a knowledge of physical chemistry or of mathematics beyond the beginning college course. According to the author, it is primarily designed for use in the teaching of a one- or two-semester undergraduate course in physical pharmacy.

Dr. Martin has included within the covers of his book excellent descriptions of methods used in measuring the physical and chemical properties of medicinal agents and dosage forms. Among the numerous features of the text are examples worked out with solutions, problems with answers, and summary tables of pertinent pharmaceutical data not previously gathered together in a book for pharmacy students.

Physical Pharmacy is divided into twenty-two chapters which are followed by an appendix. Among the subjects discussed in these chapters are the current concepts of isotonicity, modern acid-base theory, pH and buffer action, solubility and solubilization, metal ion and organic molecular complexation, accelerated methods of drug stability, rate studies of drug absorption and elimination, micromeritics of powders and physics of solid dosage forms, the rheology of suspensions and semi-solids, colloids, and interfacial phenomena. The Appendix contains a list of books related to the subjects of physical pharmacy which should prove useful to students and instructors seeking sources of references for such a course.

This book represents the first work devoted entirely to the subject of physical pharmacy. It undoubtedly serves as a most excellent reference volume for the subject. One may, however, raise the question, "Are the average students in our colleges of pharmacy trained sufficiently prior to their physical pharmacy course to enable them to comprehend much of the material as presented throughout Dr. Martin's book?"

Martin Barr
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and Science

Organic Chemistry, Volume Two, Stereochemistry and the Chemistry of Natural Products, I. L. Finar. Second Edition. Longmans, Green and Company, Inc., New York 18, New York, 1959. xi + 834 pp., 41 figs., 10 tpls. \$9.50.

As implied in the preface to the First Edition of this book (1946), the Second Edition is likewise intended especially for students reading for Part II of the Special Honours degree in chemistry of the London University. The Second Edition contains numerous additions and topic expansions, including material on conformational analysis and biosynthesis.

The work is presented in nineteen chapters with an author and a subject index. Unfortunately, original literature references to the author index are omitted, which if included, would have strengthened the book as a reference tool. To each chapter is appended a comprehensive list of selected reading references to enable students to extend their knowledge and to make up for omissions in the text.

Chapter 1, Physical Properties and Chemical Constitution, is a brief chapter presenting a minimum amount of theory. The author's main object is to indicate the applications of physical measurements.

Chapters 2 through 6 deal, respectively, with Optical Isomerism, Walden Inversion, Geometrical Isomerism, Stereochemistry of Diphenyl Compounds, and Stereochemistry of Some Elements Other Than Carbon. Material on reaction mechanisms and asymmetric synthesis appears in Chapter 3 on Walden Inversion. The stereochemistry of cyclic compounds is treated in Chapter 4 on Geometrical Isomerism.

Chapter 7 on Carbohydrates is mainly concerned with the stereochemistry of the carbohydrates and the structures of the disaccharides and polysaccharides. The chapter terminates with a brief account of the glycosides with no mention of the important cardiac glycosides.

Chapter 8 covers the Terpenes; Chapter 9 deals with the Carotenoids; and Chapter 10 presents a discussion of Polycyclic Aromatic Hydrocarbons, with emphasis on preparative procedures.

Chapter 11 on the Steroids concludes with a brief discussion of the Auxins. Chapter 12 deals with Heterocyclic Compounds Containing Two or More Hetero-atoms; Chapter 13 is on Amino Acids and Proteins, and Chapter 14 on the Alkaloids is developed on the basis of a chemical classification of heterocyclic nuclei.

Chapter 15, covering Anthocyanins; Chapter 16, dealing with Purines and Nucleic Acids; Chapter 17, pertaining to Vitamins; Chapter 18, relating to Chemotherapy and Chapter 19, on Haemoglobin, Chlorophyll and Phthalocyanines conclude the subject matter.

It is obvious that in an advanced textbook

devoted to the broad subjects of stereochemistry and the chemistry of natural products, any approach to encyclopedic coverage is prohibitive. As the Second Edition has appeared in the relatively short span of three years, the conclusion can be offered that the coverage of material should now be adequate, commensurate with the level for which the book was planned and developed.

Concerning the section on natural products in particular, the author states, "I have tried to give a general indication of the problems involved, and in doing so I have chosen, to a large extent, the most typical compounds for fairly detailed discussion." The author has attained eminent success in this approach without undue sacrifice of objectives.

The book is well written, easily read, and amply illustrated with clearly printed structural formulae, figures, and equations. It should be of value to students in pharmaceutical chemistry wishing to acquire a substantial background in the chemistry of the areas covered and may often serve as an initial guide for application to specific problems.

The book deserves consideration by those engaged in teaching in the areas of natural products in the pharmaceutical curriculum and can be recommended as a profitable addition to the pharmaceutical library.

John F. Oneto
University of California

Pharmaceutical Selling, "Detailing" and Sales Training, Arthur F. Peterson. Second Edition. Heathcote-Woodbridge, Inc., Scarsdale, New York, 1959. xviii + 384 pp., 4 tpls., 35 figs., 1 appendix. \$7.95.

The Second Edition closely resembles the first in cover, form, content, and arrangement. Its pages impress with practical information and philosophy gained from long experience. Portions have been rewritten, some illustrations are new, and an appendix has been added on problems of product toxicity and over-the-counter products.

The author speaks to the man contemplating a career in the field, picturing the opportunities and duties; the qualities of character, background, knowledge, and aptitude a sales manager seeks; what to expect in a beginners' training class; how to organize a new territory and plan the work; basic principles of selling applied to the pharmaceutical field; the ethical and practical arguments supporting fair trade and fair profit; how to detail and interview physicians; how to work with hospitals and other groups; the preparation and conduction of medical convention exhibits; and finally a survey of policy, ethics, and thrift.

The repetition of some percentage figures without change after ten years raises the question of how thoroughly the text has been revised and modernized. Perhaps insufficient attention is given to the limitations of detailing, to the enormous cost, and to the fact

that no detail man can give the full story of a drug in the short time he has with each M.D. Some authorities have pointed out the impossibility of reaching all doctors in a detailing period. The author's recommended route plan restricts the calls to selected physicians.

The chapter on detail interviews advises on the approach, after reaching the physician's office with hat and detail bag in the left hand, the proper words of introduction, the protocol of hand shaking, and how not to do it. It tells how to state the purpose of the call, when to sit and where, where to place the hat, how to hold the detail bag while talking, and reasons for not smoking. How to open the discussion and control the interview follows. It includes the use of the case method, use of questions, use of conversational style, when to give literature to the physician, timing the exit, and the use of the closing "quickie." A salesman who uses these elaborate instructions is likely to weaken his own personality and become a robot. The natural born salesman will instinctively rebel against placing such limits on his powers of self expression. However, those just starting the "adventure in selling" will find this chapter gives unusually good advice on how to proceed.

The book is written for pharmacists who consider entering pharmaceutical selling, as a refresher course for those already so engaged, and as a text for sales training courses or college of pharmacy classes. Today, when trade practices in the pharmaceutical industry are under bitter attack, the layman or legislator who reads this book will glimpse the mechanics and thinking "behind the scenes." For classes in selling and detailing the book is recommended as a text. For the pharmacy administration student its practical presentation of the hows and whys of this field fills a needed place for reading and reference. There is inspiring emphasis on professional ethics and personal integrity, something all pharmacists may profit by reading. The book should be in every pharmacy library because it gives detailed practical information in a field where few have written.

Arthur W. Reid
Ferris Institute

The Construction of Research Films. D. H. Densham. AGARDograph No. 33. Pergamon Press, New York 22, N.Y., 1959. vii + 104 pp., 8 figs. \$4.50.

This "Printed-in-Great Britain" book is one of the series of "AGARDographs" and is published for and on behalf of the Advisory Group for Aeronautical Research and Development Documentation Committee of the North Atlantic Treaty Organization. Mr. Densham is Adviser on Films, Ministry of Supply.

Anyone who is contemplating the production of a documentary or educational motion picture film is sure to find many helpful suggestions. There is consideration of

whether the film should be produced at all, whether it should be black and white or color, the problems of adding sound, and the use of animation. Costs are compared for the numerous items which go into various types of film production, "cost units" being used instead of actual money values because of the international nature of the book.

Throughout, there is an emphasis on obtaining excellent results with the greatest possible economy, there being many do-it-yourself suggestions for making equipment. But there is also great stress placed on the proper professional equipment where it is necessary, as well as the need for not being above seeking professional advice.

The book includes a complete chapter on writing a motion picture script with a detailed discussion of the conventional terminology and form of such writing. There are chapters on the Film Director, Editing, and Common Film Faults. Included is a Glossary of Technical Terms.

The book is written in a down-to-earth and interesting style, with scores of homely observations. A study of its pages will do much to dispel the idea that excellent motion pictures can only be produced by some sort of super-beings.

Arthur Moore
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and Science

A Contribution to Western Pennsylvania Pharmacy. Edward C. Reif and Thelma C. Reif. University of Pittsburgh Press, Pittsburgh, Pennsylvania, 1959. 396 pp., 23 illus. \$6.00.

As a subtitle which appears on the half-title page indicates and as one could easily guess from the surname of its authors, this book is a history of the Pittsburgh College of Pharmacy. The period covered is from 1878 to 1958. It is a handsomely edited book, well set up, with pharmacy symbols effectively used in its decoration. The text is divided into two parts: about 120 pages of bits and pieces that carry on the history of the school and about 275 pages devoted to six appendices and twenty-one documents. The greatest value of the book lies in its second part; here is a collection of source material, edited, bound, and readily available, not only to these authors but also to future researchers in the history of pharmacy, in the history of Western Pennsylvania, or in the history of the University of Pittsburgh. Included in this section are fairly complete rosters and biographical sketches of some of the school's administrators, faculty members (the faculty rosters stop with 1955), and alumni; contributed papers on various facets of the college activities; and a heterogeneous collection of *disjecta membra*, the twenty-one documents, which, among its more valuable items has (curiously) a couple of rather long and previously published addresses.

The first part of the book would have had to be written from many more sources than

these; however, except for references to the latter section and to that source material written into the text, it is without documentation. Thus it sometimes becomes difficult to separate reminiscences and editorializing from fact and faithful reporting. The account is developed along fairly strict chronological lines, perhaps the most difficult of all historical structures to build; the inclination is to include far too many items so that the inspection of the bricks interferes with the view of the building. In this book, the attempts to report, year by year, the concurrent development of a multiplicity of events has resulted in the juxtaposition of many one-sentence paragraphs, recounting isolated incidents and seemingly unrelated occurrences. The importance of these items is not questioned, but a better solution to their inclusion might have been a section devoted solely to a chronology.

The book is provincial; such an account is bound to be. However, the authors presume a knowledge of Western Pennsylvania pharmacy that their alien readers simply do not have. At one time the school became officially "The Department of Pharmacy of the Western University of Pennsylvania," yet it is subsequently referred to as "The Pittsburgh College of Pharmacy," "The College," "The School of Pharmacy," etc. Neither is any explanation offered how, after its affiliation with Western University of Pennsylvania in 1896, it later turns up as a part of the University of Pittsburgh. (A check of the history of the University of Pittsburgh in the University catalogue revealed that Western University of Pennsylvania became the University of Pittsburgh in 1908.) Such an explanation would no doubt be superfluous to a Pittsburgher, but this book, it is hoped, would have an appeal beyond the limits of Allegheny County. It was disappointing further to find the scope of the work so very limited. Little or no attempt was made to sketch the history of this important school against the background of American pharmaceutical education of the same period. This may have been the result of misguided objectivity; it certainly could not have been lack of experience or contact on the part of the authors or of the numerous representatives of the school with their contemporaries in national pharmacy. Many such contacts are cited, but scarcely is there a reference to a contribution by a Pitt man on the national pharmaceutical scene without an accompanying and totally unnecessary reminder of the deep interest of the person (or of the college) in the affairs of the profession.

Despite its few shortcomings, this book will be welcomed to the shelves of the libraries of historians of pharmacy, to pharmacy libraries of all sorts, to state historical society collections. It will be of great interest to future Pitt pharmacy students, and it should find quite a demand among the former associates of the school, especially the

alumni. Dr. George Urdang once commented that, when the whole story of American pharmacy is written, it will have been made up of contributions of individual units, geographic, economic, and social. Certainly this contribution to Western Pennsylvania pharmacy will then be an important source of material, observations, and reflections on the history of the University of Pittsburgh School of Pharmacy.

George E. Osborne
University of Rhode Island

Industrial Gums: Polysaccharides and Their Derivatives, Roy L. Whistler and James N. BeMiller, Editors. Academic Press, New York, New York, 1959. xi + 766 pp. \$25.

Gums are polysaccharides either of natural origin or synthetically modified. As suspension stabilizers, thickening and emulsifying agents, they find many uses in pharmacy, pharmaceutical, cosmetic, and other industries.

Few were the gums that were used in pharmacy and they had been around since ancient Egypt. The strides which carbohydrate and macromolecular chemistry have taken since the nineteen thirties have contributed to a phenomenal expansion in our knowledge of new and old gums. Several gums which were laboratory curiosities less than twenty years ago are now main products of multimillion dollar industries. One has only to mention methylcellulose, carboxymethylcellulose, and guar gum. Others, like sodium alginate, have seen an equally phenomenal development.

The last standard work on the production, properties and uses of gums was written by C. L. Mantell in 1947. It has been out of print for several years. In 1954 the American Chemical Society held a symposium on hydrocolloids, which was subsequently published. These two books were the major sources on the practical aspects of gums published in English in relatively recent years. Both were rather thin volumes and covered selected gums of natural origin mainly. A comprehensive treatise on gums has therefore long been due. The book *Industrial Gums*, whose senior editor was co-author of an earlier volume on polysaccharide chemistry, fills this need adequately. The emphasis of the book is on practical aspects of gum; chemical structure and physico-chemical properties are less thoroughly covered. (By coincidence, a book, *Chemistry of Plant Gums and Mucilages* by F. Smith and R. Montgomery, has just been published as an ACS Monograph by Reinhold.) The book is intended as a reference work for carbohydrate gums, their economics, processing methods, and applications. All the well-known and lesser-known natural gums are discussed. Synthetic derivatives of cellulose and starch are also included.

The thirty-one chapters cover the following products: Agar, Algin, Carrageenan, Fuco-dan, Laminaran and other lesser-known sea-

weed extracts, Chitin, Gum Arabic, Corn Hull Gum, Larch Arabogalactan, Gum Ghatti, Guar Gum, Gum Karaya, Locust Bean Gum, Pectin, Flaxseed and similar seeds, Tamarind, Ti, Tragacanth, Wheat Gums, Dextrins, Methylcellulose, Hydroxyethylcellulose, Ethylhydroxyethylcellulose, Carboxymethylcellulose, Starch Amylose, Starch Amylopectin, Starch Dextrins, Starch Hydroxyethyl, and other Starch Ethers. The inclusion of some of these substances is likely to strike the pharmacist as strange, but in modern usage all cellulose and polysaccharide products are considered gums which when dispersed in water swell to produce gels, viscous dispersions, or solutions. The inclusion of non-gum materials such as chitin, starch amylose, or laminaran was justified on the basis that they are certain to yield derivatives that will possess significant industrial value.

The editors are associated with the Biochemistry Department of Purdue University. The authors of the chapters were largely drawn from industry and they have a firsthand association with the technology and utilization of gums. Most contributors were equally thorough in the treatment of their subjects. The chapters on Algin, by McNeely, and on Methylcellulose, by Greminger and Savage, for example, are well-written reviews. The chapter on Gum Arabic, by Glicksman and Schachat, is a considerable improvement over the discussion in Mantell's book. The last-mentioned authors also discuss in greater detail than any of the other contributors pharmaceutical uses of their gum. This aspect of the book is rather uneven. Although pharmaceutical applications are mentioned in about every chapter, in many of them this reviewer would have liked greater detail. One of the best chapters in the book is on Tamarind, a polysaccharide indigenous to India and only widely used there since the last war.

Some of the gums are of minor importance here or anywhere. Their inclusion, however, marks this book as the most complete treatise on gums published in English and, as far as this reviewer knows, in any language.

The chapter on tragacanth is a glaring bad spot in the book. The word "spot" is intentionally used because the discussion is contained in less than four pages. Tragacanth is still an important and widely used gum notwithstanding its high cost. The chapter's bibliography is equally puny. It is the only chapter that mars an otherwise uniformly good book.

Extensive bibliographies including numerous patent citations are characteristic of all major chapters. The index is very detailed and helpful to anyone using this book for the wealth of information it contains.

The book is essential for everyone whose work involves the use of gums. This includes just about all pharmaceutical and cosmetic manufacturers and instructors in pharmacy.

T. Werner Schwarz
University of California

Chemistry of Plant Gums and Mucilages and Some Related Polysaccharides, F. Smith and R. Montgomery. A.C.S. Monograph No. 141. Reinhold Publishing Corporation, New York, New York, 1959. x + 627 pp., 385 figs., 63 tpls. \$18.00.

The present book is the most authoritative treatise on the chemistry of gums and mucilages to date. The facts that it is sponsored by the Editorial Board of the American Chemical Society and that the authors are top experts in their field vouch for the value and high quality of this book. It contains more than 3300 references, indicating that the literature has been meticulously reviewed.

The volume and scope of the book is much broader than those of similar previously published books. The opening chapter deals with the function and origin of gums, a topic which is still largely one of conjecture, a fact which has been emphasized by the authors. Other chapters deal with the classification, occurrence, isolation, detection, and identification of gums and mucilages. Further, detailed procedures for the separation of mixtures of polysaccharides and methods for determining their molecular weights are given. More than sixty pages are devoted to analytical procedures, many of which are new and clear-cut, and could be adopted in our undergraduate pharmacognosy laboratory courses to great advantage. One extensive chapter discusses the determination of carbohydrate structure, which would prove very interesting but rather difficult reading to most pharmacists. A greater portion of the book treats the separation and identification of cleavage products of gum and mucilage derivatives on which structure determinations are based. Special mention is made of lichen polysaccharides as well as those from sea weeds. Seven pages are concerned with structure studies based on novel, specific sero-immunological reactions.

The final chapter should prove of great interest to pharmacy teachers since it deals with modern applications and uses of gums and mucilages particularly in fields more directly related to pharmacy; and extensive formula and subject indexes of seventy pages are included.

Since the treatment of the subject matter is highly exhaustive, the book definitely appears to be too elaborate for use as a textbook at the undergraduate level, but it would be an excellent reference book for graduate courses in this field. Many of the classical concepts and definitions of these carbohydrates in our current pharmacognosy textbooks are different from those advocated in this book. It therefore appears to be an absolute necessity that future authors of pharmacy textbooks study this work thoroughly and bring their texts up to date. It should also be required reading for all pharmacognosy teachers and others who are teaching carbohydrates to pharmacy students.

Special note should be made of the fact that the term "derived carbohydrates" is not mentioned in the book, that the seaweed colloids are termed "gums," and mucilages are classified as "polysaccharides."

The typographical-technical aspects of the book are excellent. It lends itself to easy reading, and the subject index which is single columned, is very orderly arranged.

One possible disadvantage (to this reviewer) appears to be the numbering of the figures in Roman numerals, which makes them difficult to locate in the text. It appears a little awkward that, *e.g.*, the number 338 is composed of ten letters.

The chapter dealing with the botanical classification of the carbohydrate sources is interesting inasmuch as in several instances the originating plant is not identical to that given in our official compendia. The USP Revision Committee might focus its attention on this point. The botanical origins are also somewhat inconsistent with respect to the classifier's names. In most cases the latter have been omitted. The spelling of some of the scientific names is not in agreement with that of current pharmacognosy texts.

Due to its comprehensiveness, this book will be welcomed by all research workers in this field, and it should be found as a reference book in all pharmacy libraries.

Gunnar Gjerstad
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Glutathione, E. M. Crook, Editor. Biochemical Society Symposia No. 17. Cambridge University Press, New York, New York, 1960. iii + 116 pp., 17 figs., 18 tpls. \$4.50.

This book represents the papers presented at the Seventeenth Biochemical Symposia held at the University of London in February, 1958, which dealt with recent developments in the field of glutathione chemistry. In recent years, knowledge of the importance of glutathione in many basic biological processes has steadily increased, and the contributions by the various authors in this volume effectively indicate "the diverse range of interests into which this compound has penetrated." Although the coverage can not be comprehensive in such a small volume, the topics selected are adequately treated and, for the most part, the material discussed represents advances made in the last few years.

Each of the seven papers presented at the symposia, all by English scientists, deals with a separate phase of present-day glutathione research.

Isherwood, discussing the chemistry and biochemistry of glutathione, briefly reviews the available information concerning its structure, isolation, synthesis, and properties before advancing further concepts of glutathione structure. In the last portion of the discussion, it is suggested that glutathione may exist in solution as a mixture of several

different ring forms and not as a simple, straight-chain tripeptide. Evidence presented for the presence of hydrogen-bonding between the -SH and -NH groups at physiological pH values appears sound; however, less convincing evidence is presented for the formation of the thiazoline ring forms.

Thomson and Martin follow with a consideration of the techniques for determining glutathione in animal tissue. The authors found considerable agreement when determining reduced and oxidized glutathione levels in blood and cerebral tissue by the iodate procedure, amperometric procedure, and glyoxalase assay. Interference was, however, encountered in the iodometric determinations. Worthy of considerable attention are the chromatographic techniques being developed for the detection, in various biological systems, of thiols other than the non-protein sulphhydryl compounds. Studies such as this one form the backbone for future progress in glutathione chemistry, and, as C. P. Stewart indicates in the summary, "our future advance depends upon accurate and specific methods of determining glutathione in both sulphhydryl and disulphide forms."

The various enzyme systems associated with the oxidation and reduction of glutathione in plant tissue are summarized in some detail by Mapson. The fact that glutathione can be readily oxidized and reduced by a variety of enzyme systems which are widely distributed in plants has led the author to reconsider the possibility that glutathione may function as a link in a respiratory chain, at least for some components of the cell. In addition, the role of glutathione and related thiols in regulating other metabolic functions of the cell is discussed. Complementing this work on plant tissue, Jocelyn presents an interesting review of recent information pertinent to the metabolism of glutathione in animal tissue. The excellent integration of the accumulated reports affords one an opportunity of intelligently comprehending the scope and limitations of present investigations, particularly those dealing with the influence of vitamin B₁₂ and various hormones on glutathione levels.

Glutathione and neural tissue are authoritatively handled by McIlwain who brings together in a very interesting way a wealth of information which, until now, had appeared scattered in the literature. The manner in which glutathione reaches the brain and the changes it undergoes there are considered in detail. Considerable attention is also devoted to the function of glutathione in the metabolism of cerebral tissue and the brain.

Waley describes the isolation and synthesis of glutathione and its analogues in the lens. The mechanisms responsible for the oxidation and reduction of lens glutathione and its state of existence and function in lens growth and cataract formation are also discussed.

In the final paper, Hope reviews important topics directly concerned with the protective influence (against radiation damage) afforded living systems by glutathione and other sulphur-containing substances. Although very little new information pertaining to the mechanism of protective action is discussed in this review, the author does manage to introduce recent investigations dealing with the protective influences of several pharmacologically active compounds.

Considering the specificity of the subject matter under discussion at this symposium, it is gratifying to see contributions of a chemical, biological, and medical nature united without emphasis on any one particular phase of current inquiry. Without question, the value of the book is considerably enhanced because of the diversified nature of the individual reports. Although not as comprehensive nor as detailed as the *Ridgefield Symposium on Glutathione* (1954), this volume will, nevertheless, serve as an indispensable and modernized sequel. To teachers and workers interested in the chemistry and activity of the thiols, it will function as a valuable reference and should be considered a necessity for one's personal or institutional library.

Augustus E. DeMaggio
Rutgers—The State University

Microbial Variation, V. D. Timakov, Editor (translated by G. H. Beale). Pergamon Press, New York, New York, 1959. x + 202 pp., 54 figs., 59 tpls. \$6.50.

This book, as its preface specifies, is a compendium of the research accomplished at the Gamaleia Institute of Epidemiology and Microbiology. The work and the book result from "An attempt to explain the principles of variation and species formation in microorganisms, and to find out whether directed variation can in principle be made to occur, in order to obtain avirulent strains having immunizing ability." The reader may wonder, however, if the stated purpose is as much emphasized as certain philosophical points of view.

The first chapter is in reality a discussion by the editor of all of the twenty-one individual contributions. V. D. Timakov deals briefly with the philosophical differences in the approach of the Russian microbiologists from that of their western counterparts to the idea of microbial species and the factors which influence species stability and variation. He defines the concept of species in pathogenic microorganisms as follows:

The species is a group of phylogenetically related organisms, resembling each other in morphological and biological characters and possessing an hereditary ability to bring about qualitatively defined specific processes in the natural medium.

The need for this definition is brought out in this and the remaining chapters by the direction of the work toward expounding that species of bacteria as they exist today are the result of evolution through variation.

The entire theme of the book is an exposition of work showing "directed variation," that is, environmental influence upon qualitative, hereditary traits. There are twenty-one individual papers, each indicating the experimental approach to the work with results and conclusions but without discussion. Each paper presents evidence of some change in species traits of an hereditary character brought about by an outside influence. In many instances the outside influence involves growth in association with dead bacteria of another species or in direct contact with the nucleic acid of another bacterial species. Other papers present species changes occurring in association with antibiotics or bacteriophage. Of particular interest are the few articles dealing with the development of antigenic, avirulent strains (usually referred to as new species) for the production of living vaccines.

While most of the work in principle is not new to microbiologists of the western world, certainly the specific contributions are of great interest. Each paper is well written and well documented with experimental results. Some of the contributions make extensive reference to previous work in the field, while other presentations give no bibliography. In any case, virtually all of the references are to Russian work; however, the context makes it apparent that the authors are well aware of opposing research and principles.

The most startling thing about the book is the conclusions drawn from each presentation. A single theme appears in each conclusion regardless of the data presented and the possible volume and plausibility of alternate explanations: *Hereditary traits are evolutionarily developed through response to environment*. No consideration is given to alternate concepts of transformation, transduction, recombination, or mutation and selection.

Indeed, most geneticists and microbiologists previously unfamiliar with current trends of work by the Russian specialists will find this book both interesting and baffling yet extremely stimulating.

Leon J. Le Beau
University of Illinois

NEW BOOKS

- Vitamins and Hormones, Volume XVII**, Robert S. Harris, G. F. Marrian and Kenneth V. Thimann. Academic Press, Inc., New York 3, New York, 1959. xi + 359 pp., figs., tpls. \$14.00.
- Pharmacology and Therapeutics**, Arthur Grollman. Fourth Edition. Lea & Febiger, Philadelphia 6, Pennsylvania, 1960. 1079 pp. 217 illustrations. \$12.50.
- Medicine and Society in America, 1660-1860**, Richard Harrison Shryock. New York University Press, New York 3, New York, 1960. ix + 182 pp. \$4.00.
- The Pharmaceutical Society of Great Britain, Calendar 1959-1960**. The Pharmaceutical Press (Through the Rittenhouse Bookstore, Philadelphia 3, Pennsylvania), 1960. vi + 306 pp. \$2.80, postage \$0.17.
- The Story of Dissection**, Jack Kevorkian. Philosophical Library, Inc., New York 16, New York, 1959. 10 + 80 pp. \$3.75.
- Introductory Plant Science**, Henry T. Northen. Second Edition. The Ronald Press Company, New York 10, New York, 1958. xii + 718 pp., figs., tpls. \$6.75.
- Toxic Aliphatic Fluorine Compounds**, F. L. M. Pattison. Elsevier Publishing Company, Princeton, New Jersey, 1959. xi + 227 pp., 6 figs., 31 tpls. \$3.50.
- Lipide Chemistry**, Donald J. Hanahan *et al.* John Wiley & Sons, Inc., New York 16, New York, 1960. ix + 330 pp., figs., tpls. \$10.00.
- New and Nonofficial Drugs**, Council on Drugs of the AMA. J. B. Lippincott Company, Philadelphia 5, Pennsylvania, 1960. xxvii + 768 pp. \$3.35.
- Drugs of Choice 1960-61**, Walter Modell. Second Edition. The C. V. Mosby Company, St. Louis 3, Missouri, 1960. ix + 958 pp., figs., 54 tpls. \$13.50.
- Critical Problems in the History of Science**, Marshall Clagett. The University of Wisconsin Press, Madison, Wisconsin, 1959. xiv + 555 pp., 9 figs. \$5.00.
- Advances in Applied Microbiology, Volume I**, Wayne W. Umbreit. Academic Press, Inc., New York 3, New York, 1959. xi + 304 pp., figs., tpls. \$9.50.
- Theoretical Organic Chemistry, Papers Presented to the Kekule Symposium Organized by the Chemical Society London**. Academic Press, Inc., New York 3, New York, 1959. xvii + 298 pp., figs., tpls. \$9.50.
- Automatic Titrators**, J. P. Phillips. Academic Press, Inc., New York 3, New York, 1959. viii + 225 pp., figs., tpls. \$6.00.
- Annals of the New York Academy of Sciences, Amine Oxidase Inhibitors, Volume 80, Art. 3**, Otto v. St. Whitelock *et al.* Academy of Sciences, New York, 1959. 551 + 1046 pp., figs., tpls. \$5.00 (paper).
- Pain**, W. Noordenbos. Elsevier Publishing Co., Princeton, New Jersey, 1959. v + 182 pp., 40 figs., 3 tpls. \$8.50.
- Neuro-Psychopharmacology**, P. B. Bradley, P. Deniker and C. Radouco-Thomas. Elsevier Publishing Company, Princeton, New Jersey, 1959. xv + 727 pp., figs., tpls. \$27.00.
- Antibiotic Therapy for Staphylococcal Diseases**, Henry Welch and Felix Marti-Ibanez. Medical Encyclopedia, Inc., New York 22, New York, 1959. xii + 208 pp., 3 figs., tpls. \$4.50.
- A Pharmacologic Approach to the Study of the Mind**, Robert M. Featherstone and Alexander Simon. Charles C. Thomas, Springfield, Illinois, 1959. xxviii + 399 pp., figs., tpls. \$10.75.
- American Drug Index 1960**, Charles O. Wilson and Tony Everett Jones. J. B. Lippincott Company, Philadelphia 5, Pennsylvania, 1960. 712 pp. \$5.75.
- The Central Nervous System and Behavior, Translations from the Russian Medical Literature**. The Josiah Macy, Jr. Foundation Publications, New York 36, New York, 1959. 1051 pp., figs., tpls. Free (paper).
- The Medical Annual**, R. Bodley Scott and R. Milnes Walker. The Williams & Wilkins Company, Baltimore 2, Maryland, 1959. xi + 620 + 19 pp., 40 figs., tpls., 66 plates. \$9.00.
- Organic Chemistry, Volume One**, I. L. Finar. Third Edition. Longmans, Green & Co., Inc., New York 18, New York, 1959. xv + 822 pp., figs., 10 tpls. \$9.50.

- Biochemistry in Relation to Medicine**, C. W. Carter, R. V. Coxon, D. S. Parsons, and R. H. S. Thompson. Third Edition. Longmans, Green & Co., Inc., New York 18, New York, 1959. xiii + 628 pp., figs., tpls. \$10.00.
- Diagnostic Biochemistry**, Halvor N. Christensen. Oxford University Press, New York 16, New York, 1959. ix + 291 pp., figs. \$6.50.
- Cholinesterases, A Histochemical Contribution to the Solution of Some Functional Problems**, M. A. Gerebtzoff. Pergamon Press, New York 22, New York, 1959. vii + 195 pp., 125 figs., 4 tpls., 7 plates. \$8.50.
- Practice in Thinking**, Jay A. Young. Prentice-Hall, Inc., New York 11, New York, 1958. xviii + 92 pp., 12 figs. \$3.25 (paper).
- Laboratory Tests in Common Use**, Solomon Garb. Second Edition. Springer Publishing Co., Inc., New York 10, New York, 1959. 185 pp., tpls. \$2.50 (paper).
- The Principles of Electrophoresis**, René Audubert and Serge de Mende. The Macmillan Company, New York 11, New York, 1960. viii + 142 pp., 102 figs., 30 tpls. \$7.00.
- Essentials of College Chemistry**, Paul R. Frey. Prentice-Hall, Inc., New York 11, New York, 1960. xviii + 520 pp., figs., tpls. \$6.95.
- Evaluation and Presentation of Spectro-Analytical Results**, A. B. Calder. The Macmillan Company, New York 11, New York, 1960. 47 pp., 2 figs., 5 tpls. \$1.25 (paper).
- British National Formulary**, The British Medical Association. Standard Edition. The Pharmaceutical Press (through The Rittenhouse Bookstore, Philadelphia 3, Pennsylvania), 1960. 272 pp. \$1.05. Interleaved \$1.65.
- Methods in Medical Research, Volume 8**, H. D. Bruner. Year Book Publishers, Inc., Chicago 11, Illinois, 1960. xiv + 368 pp., figs., tpls. \$9.75.
- The Merck Index**, Paul G. Stecher, M. J. Finkel, O. H. Siegmund, and B. M. Szafranski. Seventh Edition. Merck & Co., Inc., Rahway, New Jersey, 1960. xi + 1641 pp. \$12.00.
- Veterinary Drugs in Current Use**, Rudolph Seiden. Springer Publishing Co., Inc., New York 10, New York, 1960. 1 + 128 pp. \$2.25 (paper).

MISCELLANEOUS

- Vocational and Professional Monographs. Pharmacy**, Earl P. Guth. Bellman Publishing Company, Cambridge 38, Massachusetts. 24 pp. \$1.00 (paper).
- The Workings and Philosophies of the Pharmaceutical Industry**. National Pharmaceutical Council, Inc., New York 20, New York, 1959. 159 pp., charts. Free (paper).
- Important Medicinal Plants of Florida**, C. H. Johnson. State of Florida, Department of Agriculture, Tallahassee, Florida. iv + 51 pp. Free (paper).
- The Graduate School and the Decline of Liberal Education**, Earl J. McGrath. Bureau of Publications, Teachers College, Columbia University, New York 23, New York, 1959. x + 65 pp. \$1.50 (paper).
- The Lynn Index, A Bibliography of Phytochemistry, Monograph IV**, John W. Schermerhorn and Maynard W. Quimby. Massachusetts College of Pharmacy, Boston, Massachusetts, 1960. 70 pp. \$1.00 (paper).

Even if their up-to-date pharmaceutical competence were guaranteed, to expect state board members to be skilled test-builders is as unreasonable as expecting test technicians to be competent pharmacists.

H. H. Remmers, *Am. J. Pharm. Ed.*, 13, 62 (1949)



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